CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

JULY 1991
VOLUME FOUR NUMBER TEN
SEVEN DOLLARS

COVER STORY

Telecommuting: The Home-Field Advantage

Reconsidering Legendary Strategic Systems

The State of California's David K. Fleming

AN INTERNATIONAL DATA GROUP PUBLICATION

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CIO

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COVER STORY

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At a time when highways are clogged, office space is at a premium and valuable workers can be hard to hang onto, telecommuting offers benefits to employers and employees alike.

By Meghan O'Leary

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Whether by clever adaptation, persistent outreach or sweeping reform, systems developers and user departments work to bridge the gap between them.

By Paul Konstadt

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The aura of magic that has long surrounded such legendary IT systems as Sabre and ASAP may owe less to the systems themselves than to their organizations' underlying business strength.

By David Freedman

Starting Over 50

Silo Inc.'s once-outsourced IS department comes in from the cold and begins the long journey toward distributed computing.

By Kathleen Melymuka

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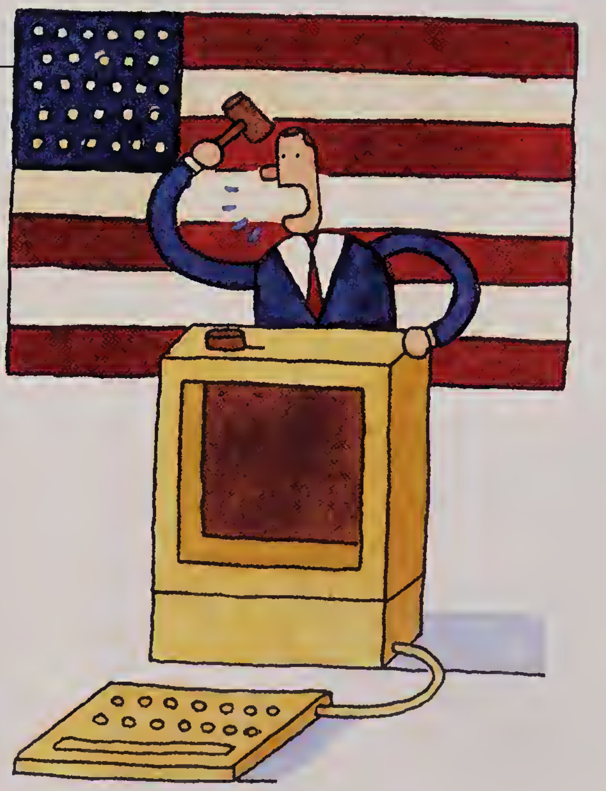

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Giorgio Sorani
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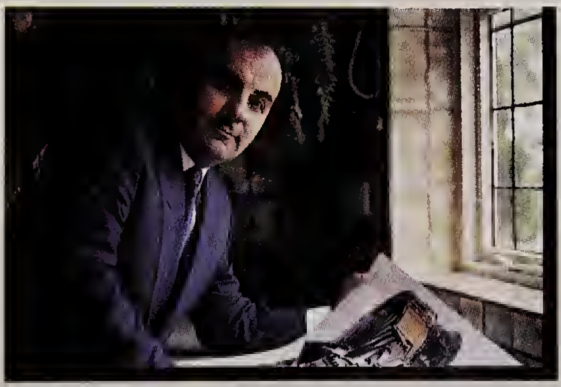

"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development.."

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Venkat (Vinnie) Tiruviluamala
Director, CPC/CPPC Information Systems
SONY Corporation

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Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

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Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

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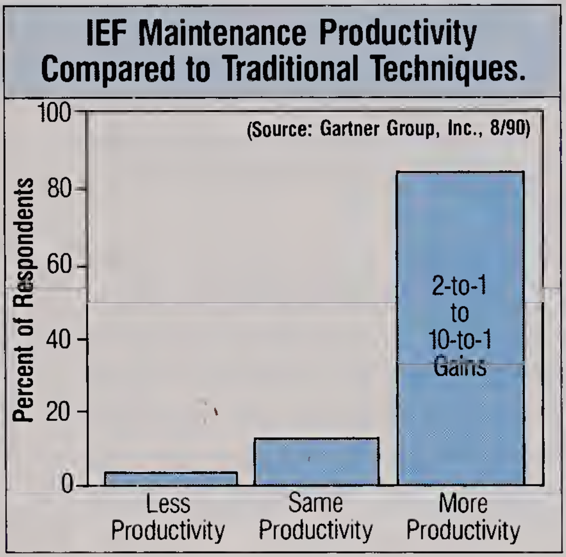

Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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The message is loud and clear, sounding from many fronts. The workplace is changing—radically. Organizations are flattening and downsizing. New workers entering the labor force are woefully undereducated and unskilled, and the situation will only get worse. Brainpower is at a premium and leveraging intellectual assets is a challenge.

Lifestyles and values are changing as well: The materialistic "me" generation of the 1980s is settling down, creating a baby boomlet, and assuming a Norman Rockwellian aura while still moving at a breakneck pace.

How is corporate America coping with such changes? Flexibility is becoming the rallying cry. Job sharing arrangements, part-time work schedules for employees, including managers and professionals, and flexible hours are a few of the solutions organizations are implementing. Although most organizations are having a difficult time loosening the reins, those companies leading the way are garnering results. One thing is certain: The pressure for more work options will not abate.

Information technology contributes significantly to an organization's ability to be flexible. Our cover story this month ("Home Sweet Office," beginning on Page 30) considers telecommuting. While the idea of working at home or from remote locations has been around for at least a decade, it has been viewed as a mere perk, or appropriate only for workers who weren't serious about their careers.

Senior Writer Meghan O'Leary explores the contributions and caveats of allowing employees the flexibility of working outside the office. Companies have discovered that most workers recognize the importance of interacting with their workgroups and consequently prefer to telecommute only two or three days per week. Sensitive to productivity issues, organizations are taking care to determine the type of employee who is suitable for telecommuting and are setting performance objectives and standards. The results indicate that people who work well in the office also work well at home.

Telecommuting proponents report productivity improvements of about 20 percent for telecommuters. While productivity may be quantifiable, the ability of an organization to offer flexible working arrangements to employees returns something much more valuable in the long run—higher morale and increased loyalty.

Marcia Blumenthal

CIO

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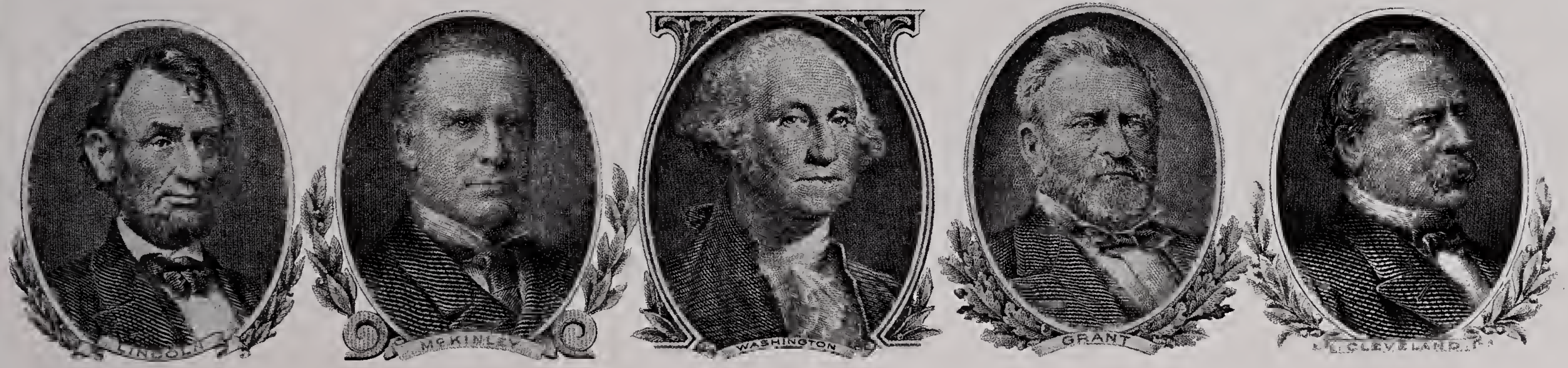

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LETTER FROM THE PUBLISHER

> *"United Technologies' need to handle operating and financial information consistently and more rapidly around the world drove us to a distributed solution. The key elements of our successful implementation were leadership and intense focus on the human dimensions of change."*
>
> *John Hammitt*
> *Vice President of Information Systems*
> *United Technologies Corp.*

PHOTO BY GEORGE SIMIAN

The issues and benefits associated with moving from a centralized to a decentralized—or distributed computing environment have been widely reported in *CIO* Magazine's pages. When evaluating such a massive change, corporate executives must answer many key questions: Which applications should be decentralized and which must remain on the corporate system? How will IS maintain control over system security? What architectural, hardware, software and networking standards will be utilized? How will IS be able to ensure that these standards are maintained by users across the enterprise?

Once these issues are dealt with, many companies move on to quickly define and implement their distributed processing plan. Unfortunately, the human side of the equation is often disregarded. Critical issues such as end-user involvement in needs identification and standards selection and employee training for system success are often overlooked. And as good as the distributed architecture, its associated technologies and its promise of new benefits may be, it is virtually useless without employee buy-in.

In addition, the repositioning of IS's role in the new decentralized computing environment and companywide communication of that new role is often neglected. That leaves IS—and the CIO—open to criticism by end users and management alike.

CIOs have a tremendous opportunity to rise above the uncertainty brought about by distributed computing to further evolve their roles in their respective organizations. By becoming missionaries and teachers, they can pave the way for change and help to remove the fear factor among employees by involving them in the change process.

CIOs can also redefine IS's role to include the delivery of comprehensive end-user training programs so critical to the successful implementation of distributed computing. In the process, CIOs can enrich their own jobs, as well as those of their staffs.

P.S. Our next CIO Perspectives Conference, "IT and the Corporate Agenda: People, Productivity and Profits," will be held Sept. 22–25 in Monterey, Calif. For more information, please refer to the brochure bound with this issue of *CIO* or call 800 366-0246.

Coming In CIO

The CIO-100: Delivering Quality

Each year, *CIO* bases the selection of its CIO-100 on a different criterion in order to explore some of the interesting and relevant business issues of the day. Our focus next month is on quality and how IT helps companies to achieve it.

From the Jaws of Defeat

Businesses at the end of their rope can sometimes spring back with a well-managed turnaround. But they are unlikely to succeed without the IS department offering critical support in charting a new course.

Chicken or the Egg

It may sound backward for a business to begin by putting its information systems in place and then distributing the company around them. But VeriFone Inc. did just that, and as a result has blossomed into a $150-million company with a 65 percent market share.

The Conundrum of the IS Mission

IS is supposed to give users what they want, yet many users do not know (or cannot articulate) what that is. Worse, users may *think* they know what can help without understanding the limitations of the technologies involved.

They're very different companies. But they all share the same competitive edge.

REALITY gives Texas Meridian Resources up-to-the-minute well analysis and oil and gas revenue checks.

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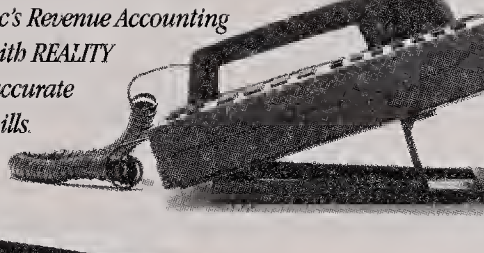

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TRENDLINES

HEALTH CARE

RESTRAINED PATIENT RESTRAINT

Until recently, the only reliable way to prevent wander-prone hospital and nursing-home patients from straying off the reservation was either to sedate them to the point of inaction or to physically restrain them. Though effective, both alternatives are also cruel, prone to abuse, degrading and unduly confining to patients, as well as distasteful to their relatives and to health care professionals. In addition, both measures are increasingly circumscribed by regulations governing humane patient care.

Still, the problem of wandering patients is a serious one. Many of the nursing home–bound elderly, particularly those disoriented from the effects of Alzheimer's disease, can become lost, wandering into potentially life-threatening situations involving such perils as highway traffic and the elements. Finding ways of limiting the danger to patients (along with the liability of caregivers) without also limiting their freedom and dignity has been a long-standing challenge.

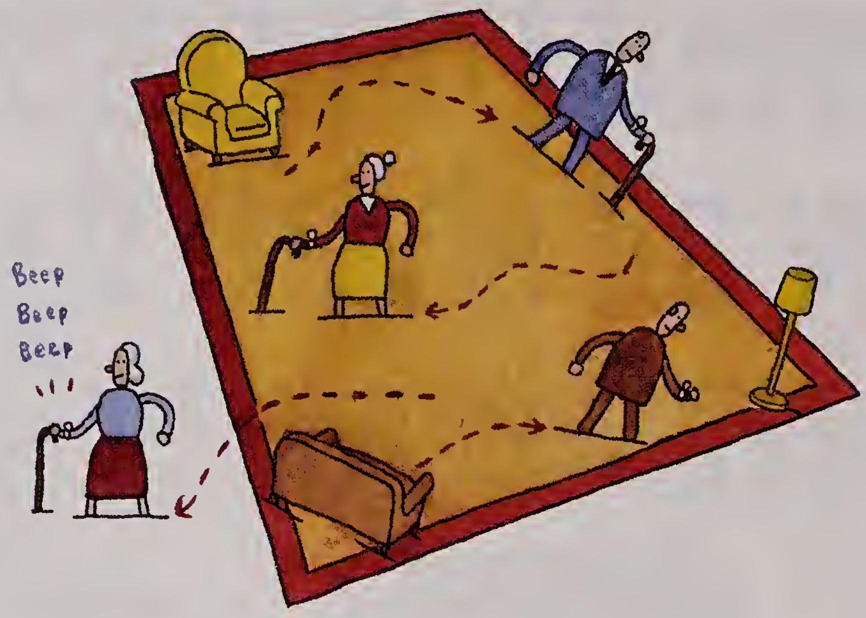


ILLUSTRATION BY JAMES KACZMAN

Now, using the same radio-frequency technology that combats retail shoplifting, patients' whereabouts can be safely and humanely monitored. The systems (such as those from Security Tag Systems Inc., of St. Petersburg, Fla., and D/A Technology, of Needham, Mass.) involve attaching a lightweight plastic transponder bracelet to the patient's wrist or ankle and outfitting control-point doorways with low-frequency transmitters. In the case of the Security Tag system, when a transponder-wearing patient goes through an off-limits doorway, the transponder signal activates an alarm mounted over the door. The D/A Technology system also features a local alarm, but the signal can be routed back to a nurses' station or other central security outpost as well.

The technology is also increasingly being used in hospital maternity wards to prevent infant abductions. But as D/A Technology executive vice president and COO Victor Delmonte observed, "There's an increased liability problem [with the maternity ward application]. With Alzheimer's patients, there's obviously no intent to defeat the system. But in the case of an infant abduction, there's an intent there. The easiest way to defeat the system is just to snip off the tag." The tags can be hidden in diapers, said Delmonte, but no defense is foolproof, and D/A is careful to remind customers of this. "These systems are one tool, but they're not a substitute for other kinds of security," he said.

GETTING STARTED

As founder and president of Digital Equipment Corp., Kenneth Olsen knows a thing or two about how to turn a start-up company into a successful enterprise. Now Olsen wants to help out other Massachusetts entrepreneurs by offering reduced rates for computer equipment, software and services.

Through DEC's Entrepreneurial Grant Program, all of the company's products and services (including applications software and consulting) are offered with a 40 percent grant, while workstations and PCs carry a 50 percent grant. The one-time grants are available to start-up companies incorporated in Massachusetts between May 1, 1990, and June 30, 1992.

Olsen believes that the grant program will reduce some of the risk inherent in start-ups by making computers more affordable than ever. "Computers can make start-ups successful faster," Olsen said, "and might also create new ideas once in the hands of the entrepreneur."

Perhaps with the aid of DEC, the economic "miracle" might even return to Massachusetts.

For additional information call 800 332-4568.

NO STRINGS ATTACHED

The business market for cordless communication equipment will outpace that of wireless LANs, according to Insight Research Corp., a telecommunications market research and competitive analysis firm. While the market for wireless LANs should grow from $79 million today to $235 million by 1995 (a compound annual growth rate of more than 31 percent), wireless PBXs and key telephone systems in the office will enjoy a 50 percent compounded annual growth rate, going from a $34 million market today to a $171 million market by 1995. (The total market for cordless phones, including residential use, should grow from $323.9 million in 1991 to $435 million in 1995.)

The increased use of cordless analog telephones in the workplace will open the market for wireless digital business communications systems, said Insight president Robert Rosenberg. In addition, the cost of wireless business telephone equipment should drop, he added. Conversely, the glut of commercial office space—at a time when so many newly constructed office buildings are adequately prewired for LAN flexibility—will hold down the growth of wireless LANs in the white-collar world. Wireless LANs are also a tough sell in large manufacturing operations where production lines are relatively stable, but may appeal to companies where factory lines have to be reconfigured every few months.

TRENDLINES

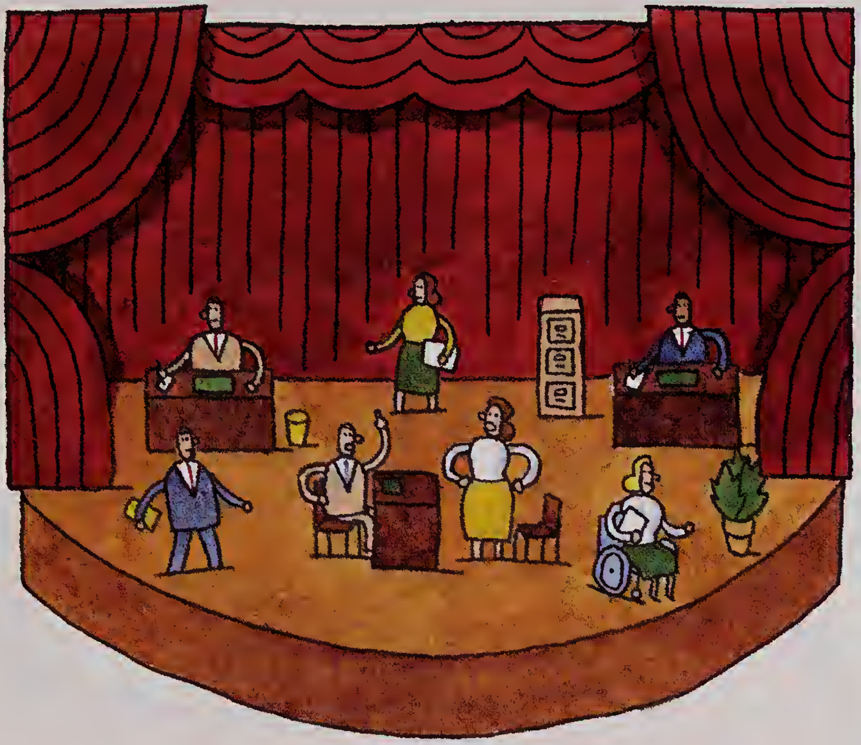
HANDLING DIVERSITY

MANAGING A CAST OF THOUSANDS

Xerox Corp. has opened the curtains and turned up the footlights on diversity management.

In a first-of-its-kind training program, the company is using interactive theater to sensitize employees to the complexities of managing a workforce increasingly characterized by diversity in race, gender, age and ethnicity. The program, developed by Cornell University's Theater Arts Outreach Group, uses actors to perform on-the-job scenarios that challenge managers in the audience to confront their prejudices. All the office may be a stage, these sketches suggest, but all its men and women are *not* merely employees.

The four-hour program is composed of four skits. In one, a woman is denied a promotion because her manager is concerned about the intrusiveness of her family obligations. Another involves a longtime employee who feels taken for granted as younger colleagues are quickly recognized and promoted. A third portrays a well-qualified minority design engineer whose manager assigns her only menial duties, and the fourth concerns a Hispanic employee who is belittled by his colleagues after receiving a promotion.



Following the skits, the actors remain in character and improvise answers to questions and comments from the audience.

In order to ensure that the scenarios were realistic, the Cornell group met with Xerox employees to hear their concerns and learn about the company's corporate culture and language. "They've captured our language. They've captured our subtleties. They look and they sound just like us," said Deborah Smith, Xerox vice president of human resources and support services.

The issue of managing diversity in the office is becoming more urgent: Studies indicate that by the year 2000, 85 percent of new entrants to the workforce will be women and minorities. A heightened corporate awareness may help prevent such ills as high turnover, low morale and employee dissatisfaction.

"We have to get people thinking about these issues," said Smith. "This program is a unique approach to a situation common to all businesses." ■

INTERACTIVE HOTELEVISION

With a little help from technology, you may be able to clean up at the gaming tables or be the next contestant on "The Price is Right" without leaving your hotel room.

Spectradyne Inc., a Dallas-based communications vendor, will begin testing a pay-per-view interactive television system that allows hotel guests to actively participate in programs. Working in conjunction with ACTV Inc., the Spectradyne system will be tested on the company's Guest Choice system during the fourth quarter of 1991. Initial test programs will include blackjack, in which a host dealer asks for decisions from viewers, and game shows in which viewers compete for prizes. Eventually, the company sees interactive television encompassing a variety of programming, such as children's shows featuring responsive puppets and exercise programs allowing viewers to customize their routines.

If the new system catches on, magic fingers could be a thing of the past. ■

KUDOS

Merrill Lynch & Co. Inc.'s DuWayne J. Peterson Jr. has been named the first Lattanze Information Systems Executive of the Year. The award recognizes continuous improvement in the quality of information systems support of an organization's objectives.

Peterson joined Merrill Lynch five years ago as CIO, with a charter to beef up the firm's computers and communications. He retired last month as executive vice president of operations, systems and telecommunications. Throughout his tenure at Merrill Lynch, he has been a vocal proponent of total quality management and customer satisfaction.

The award, presented by the David D. Lattanze Center for Executive Studies in Information Systems, a part of Baltimore's Loyola College, honors Peterson's extensive accomplishments at Merrill Lynch. His impact will continue to be felt at the company through what has come to be known as "Peterson's IT Infrastructure Blueprint." Peterson also plans to continue his association with Merrill Lynch as a consultant. ■

ILLUSTRATION ABOVE BY JAMES KACZMAN; BELOW BY DIANNE BENNETT

1975 *Launched the first U.S. public data network.* 1979 *Built the first commercial private packet network.* 1980 *Introduced the first major public e-mail service.*

MADE FOR EMERGENCIES.

1988 *Sprint completes the only nationwide 100% digital fiber optic network. Sprint awarded 40% of FTS 2000 contract.* 1989 *World's first and largest privately-owned*

1985 *Sprint introduces the world's first VPN.℠* 1986 *First transcontinental fiber optic call transmitted by Sprint.* 1987 *Eight million FŌNCARDs℠ distributed in first year.*

MADE FOR PREVENTING THEM.

Let's face it. There's no way you can stay competitive if your entire data network goes down. That's why you should take a close look at Sprint.®

Because our entire network was made to maximize uptime. It has 100% digital switches. And 100% fiber optic transmission. Nationwide. Along with built-in redundancy to protect critical data. Maybe that explains why we had no interruptions during Hurricane Hugo. Or the 1989 San Francisco earthquake.

So if your data means as much to you as we think it does, call us at 1-800-800-1517. We'll have detailed information in your fax machine in minutes. And we'll show you the right way to send data. On a network that was literally made for it.

Sprint.®
Made for data.℠

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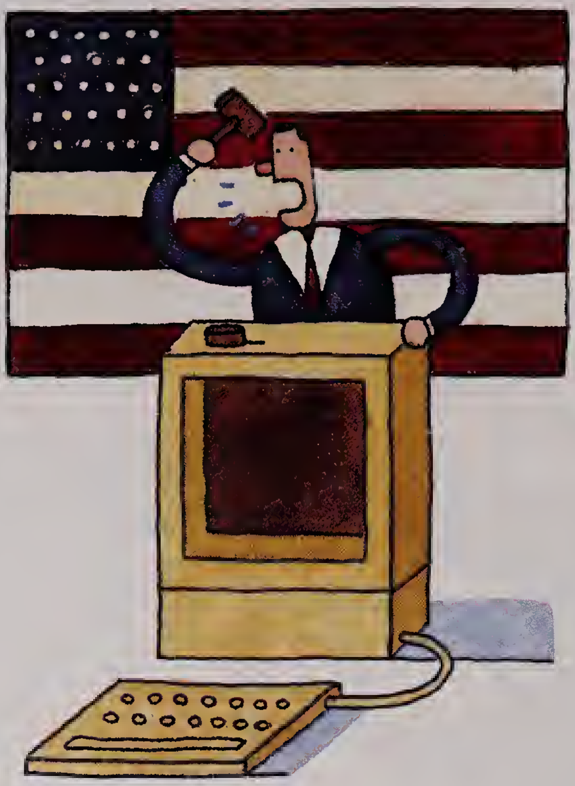
transatlantic fiber optic cable completed. 1990 *Sprint announces the first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

TRENDLINES

EXECUTIVE SUPPORT

A VOTE FOR MODERNIZATION



Michigan state senators have gone back to the future to implement a sophisticated executive support LAN in their restored 19th century chambers. The unobtrusive flat-screen displays installed at each senator's desk—like the hidden telephones, speakers and other modern equipment—provide legislators with the electronic perks of this century but do not detract from the period decor of the room.

The executive support system, rolled out in January 1990, was spearheaded by John Engler, then senate majority leader (now governor), and Secretary of the Senate Bill Snow. Engler and Snow wanted to replace the electronic vote system installed in the 1970s with a more robust LAN-based system. The state Legislature's decision to restore the senate chambers to their original look provided the opportunity to switch systems.

"As we started out, we felt that many of the members would not be comfortable with new technology," recalled Snow. "So we had to design a system that would be very easy to use." They opted for a touch-screen approach to basic legislative functions (such as voting), but senators more familiar with computers can also use a mouse or the keyboard for more advanced functions. The new executive support system allows users to do everything they did with the electronic vote technology, such as review the list of senators who had requested to speak on an issue or view an amendment under consideration. But the new software-based system also enables senators to analyze votes alphabetically by senator, by party or by yes and no votes cast.

In addition, senators can now use the executive support system to refer bills to committee, look at the Senate Journal (the official record of actions taken by the body), check a daily calendar, use E-mail or access the computer in their offices. Soon they will be able to write bills electronically, too.

While all the screens in chambers are IBM PS/2 Model 70s, the executive support system is a senatewide fiber-optic token-ring network, linking IBM personal computers or Macintosh computers in the senators' offices. Governor Engler, meanwhile, has installed a new Mac-based system in his office, and is looking at ways to tie his computer into the Legislature.

NEW VENTURES

The Travelers Corp., which has been using artificial intelligence to cut down on insurance fraud, has helped fund a new computer science and software engineering laboratory at Trinity College in Hartford, Conn. The $300,000 grant also provided for an annual cash award to the Trinity senior with the best computer/engineering research project. Past awards have gone to students for research on prosthetic devices and the effects of malnutrition on the developing brain.

Some 9,000 General Motors dealers are set to begin receiving secure transmissions of video programs via the GM Pulsat Network. The programs, which contain proprietary competitive information, owe their security to GM's recent deployment of Scientific-Atlanta's B-MAC video scrambling product. Dealers can view programming on such subjects as new rebate incentives and financial and leasing programs. B-MAC provides delivery of video, audio, error-corrected data and teletext signals in the same satellite signal. At the same time, it scrambles the signal and addresses it to only authorized recipients. The Pulsat Network, the world's largest private satellite network, helps dealers "provide a faster, more accurate response to customer sales and service needs," said a GM official.

HIGH HILAR-IT

Ever find yourself daydreaming that Bart Simpson was all grown up and working as a systems developer? Or wishing that Cliff Clavin would leave the U.S. Postal Service and go into E-mail management? For those information managers who mourn the lack of humor in their chosen field comes *Infomaniacs: A Brown Paper Bag View of Information Interaction in Corporate America.*

Authors Joseph S. Casciato and Robert M. Vass have written a "taken-with-a-grain-of-salt, tongue-in-cheek view of information" for everyone who gives or receives it. *Infomaniacs* takes the reader to a land where "information abounds and the demands for it are never satisfied," inhabited by "mirror images of the various types of information users found in our world." The authors explore how these characters deal with such nefarious types as the in-house PC-guru ("whose psyche demands simultaneous doses of attention and obscurity") and the outside consultant (who "raises to an art form the dissemination of biased information"). They tackle business bugbears like jargon and information overload, offer practical suggestions on everything from preparing for meetings to revamping MBA programs, and sprinkle the whole liberally with quotes and cartoons.

Infomaniacs is available from Sierra Corp., 2539 Jenkintown Road Suite 101, Ardsley, Pa. 19038, at $14.50 per copy plus shipping and handling.

ILLUSTRATION BY JAMES KACZMAN

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

CONFERENCE PREVIEW

MONTEREY, CALIFORNIA

SEPTEMBER 22-25, 1991

People
Productivity
Profit

Workforce Diversity

Competing on Leadership Alone

People-Centered Productivity

The New American Paradigm

Time-Based Competitiveness

Rapid Technology Exploitation

Solving the Workplace Skills Crisis

And More
(see Table of Contents)

TOM PETERS

When "Getting It Wrong the First Time" Pays Off

© 1991

CIO

CONFERENCE OVERVIEW

Joe Levy and Lynda Rosenthal

PEOPLE: THE KEY TO COMPETITIVENESS

Businesses, regardless of their size, must develop and retain a high quality work force to stay competitive.

AGENDA

Session topics, presenters, times and scheduled activities are outlined.

COMPANION PROGRAM

Bring your companion. He or she will join you in conference receptions and meals while enjoying independent activities in the Monterey area.

DEL MONTE GOLF COURSE TOURNAMENT

Lush, scenic and gentle greens are the only way to describe the oldest golf and challenging tournament course west of the Mississippi.

CONFERENCE HOSTS

Select industry innovators in IT products and services will have a display/demonstration area during the conference.

MONTEREY PENINSULA

A spectacular coastline and history, museums, shopping, wineries and fine dining make this area a wonderful destination.

ENROLLMENT FORM

Coin & gear photo, Jim Scherer
Tom Peters photo, courtesy The Tom Peters Group

Conference Overview

The need for a conference addressing the issues of work place literacy, work-based learning, ethnic diversity, and skill competencies has been underscored by President Bush's recent headline-making pronouncements regarding the education and work force crises in America. It is now critical for companies to develop a new corporate agenda to address these issues before they further encumber America's global competitiveness.

American companies are facing a new reality in the labor force. Jobs are changing faster than workers' ability to perform them. Moreover, our educational system is failing. The quality of education in America is being decried in articles from the *Harvard Business Review* to the front page of the *Los Angeles Times*. These dual trends are causing private sector companies to compete not only on product reliability and value, but also as employers. Is computer technology the solution or is it part of the problem? What can the CIO do to ensure that IT helps to avoid the crisis in the work place?

Can IT help manage an ethnocentric work force, make work more satisfying and motivating for workers, and decrease employee turnover while increasing worker productivity? Participants in the next *CIO Perspectives* conference will hear from private and public sector leaders who are successfully administering IT-based programs aimed at addressing these and other issues. Clearly, corporations and the public sector will have to develop a new corporate agenda which includes work-based learning programs designed to create a work force with an acceptable level of literacy skills.

These issues, and the role of the CIO and other corporate change agents in resolving them, will be explored in Monterey, California, September 22nd–25th. At the next *CIO* conference, **IT and the Corporate Agenda: People, Productivity and Profit**, participants will investigate current and emerging seminal issues from business, technological, societal, ethical and legal perspectives. In keynote, general and concurrent sessions, informal dialogues, and a variety of idea sharing opportunities, conference participants will examine how these matters affect their organizations.

If safeguarding your organization's competitiveness in the '90s and well into the next century is important to you, we invite you to join us in Monterey. And we invite you to bring other senior executives concerned with these issues. This is the *only* conference designed to give you practical ideas to help solve the work place skills crisis in your organization.

To guarantee your attendance at *IT and the Corporate Agenda: People, Productivity and Profit*, simply mail your completed enrollment form or fax it to us at 508/872-0618, attention Lynda Rosenthal. Or call toll-free 800/343-4935, extension 4631 (in Massachusetts, 508/935-4631).

Joseph L. Levy
President & Publisher
CIO Publishing Inc.

Lynda Rosenthal

Lynda Rosenthal
General Manager
Executive Programs

"Most senior executives are feeling the discomfort of a paradigm shift. For years we believed that technology was the key to competitiveness. It is becoming clearer that while technology is important, corporate culture is more important. It is evident that the key to competitiveness both for our nation and our corporations is a culture that focuses on education and improving workers' skills. CIOs who harness IT in support of this new culture will find themselves playing an increasingly important role as this paradigm shift unfolds."

Michael Behar
President and CEO
University Communications, Inc.

People
THE KEY TO COMPETITIVENESS

Index Stock

For years, technology has been viewed as a key to a company's competitiveness. U.S. companies have invested billions of dollars in computers and networks that crunch and carry huge amounts of information at lightning speeds all over the world. But many companies are finding that none of it works without a key ingredient: a high quality work force.

Over the last decade, companies have gradually discovered that their workers lack many of the skills needed in the Information Age. New York Telephone Company had to test 57,000 applicants to find 2,100 who were qualified to become operators and repair technicians. IBM, after installing millions of dollars worth of computers in a Burlington, Vermont, factory, found it had to teach high school algebra to thousands of workers before they could run the machines.

The inadequacy of the American work force to handle the jobs of today, much less tomorrow, puts a heavy burden on American business. "These skills deficiencies are costing American business monetarily, through waste, lost productivity, increased remediation costs, reduced product quality, and ultimately a loss in competitiveness," declared a 1988 U.S. government report.

Superstock

Building A Quality Work Force

For example, one Florida manufacturing company has estimated that it could save up to $1.2 million a year if its employees had stronger math and reading skills, says the report. The poor math skills mean employees waste materials because they have trouble measuring. The poor reading skills keep workers from reading blueprints correctly, thus forcing the plant to redo orders and pay overtime.

The problem is the result of the confluence of several changes. The U.S. work force is becoming increasingly diverse, with more women and minorities entering the work force than white males. At the same time, the nature of work is changing: This presents unique organization and management situations that businesses must respond to. Unlike the Industrial Age, which required workers to perform manual, repetitive tasks, the Information Age calls for workers to do intellectual and varied tasks. But the U.S. educational system has not only not kept up with these skill changes; it has declined in its effectiveness to educate the population to even minimal levels. And to top it all off, the number of new workers available is shrinking because of a drop in birth rates that began in the 1960s.

Superstock

The makeup of the U.S. work force is undergoing dramatic change. With this increasing diversity comes a number of challenges for corporate America. And because employers will be desperate for skilled workers, qualified entrants will be in a position to make demands. For instance, three quarters of working women are in their childbearing years. With more women entrants in the job market, corporate help with child care may become a requirement in order to attract the best talent. With the U.S. population aging, companies will not only need to give their employees time off to care for elderly parents, but may also try to entice those elders, many of whom have good skills, back into the work force. With more immigrants coming into the labor pool, instruction in English as a second language may become a necessity. With more blacks and Hispanics in the work force, the need for corporate-provided education will increase, for these two groups have the highest school dropout rates in the country, according to *Business Week* magazine.

Index Stock

A Different Skill Set

Concurrent with this shift in the makeup of the workforce has come a shift in the nature of work. Technology has caused an upgrading in the level of skills required in jobs. In today's corporations, computers do many of the repetitive tasks once performed by people. Middle management has been slashed and decision-making power is being pushed down in the organization to the lowest levels. Workers are being asked to direct themselves and to make decisions based on complicated information that is provided to them by computers.

Thomas Bailey, a senior research associate at Columbia University, has called this trend the "upskilling" of American jobs, meaning a change from learning based on observation to learning acquired through symbols, both verbal and mathematical. Today's factory worker, for example, must understand statistical process control theory and be able to read charts and graphs that track manufacturing quality levels. If something goes wrong in the process, he or she must have the communication skills to explain the problem, and the reasoning skills to suggest a solution.

Few employers are finding workers with those skills, says the government's report on work force quality. Two-thirds of the employers consulted assessed the current pool of entry-level applicants as being insufficiently prepared in basic skills. "In addition to the three Rs, business noted that today's jobs require skills, attitudes, and abilities generally thought of as needed at the supervisory and managerial level. Businesses, regardless of location, size, or type, consistently noted deficiencies in such areas as problem solving, self discipline, acceptance of responsibility, reliability, initiative, teamwork, and the work ethic. Specifically, in countless conversations, employers reiterated a need for young people to be able to figure out what they need to know and how to find that information. Above all, they note that employees must be able to think their way creatively through tough problems."

And the problem will only get worse. About 90 percent of all scientific knowledge has been generated in the last 30 years, and this pool of knowledge is expected to double again in the next 10 to 15 years, according to the Commerce Department. "Future jobs will be restructured about every seven years and work and learning will be inseparable," predicts David Kearns, former chief executive of-

Motorola Starts a University

In its efforts to increase quality and productivity during the last few years, Motorola began putting more emphasis on training. In 1989, the company declared that by 1992 each and every Motorola employee would receive five full days of training annually.

But when the company began retraining its workers in new quality-oriented manufacturing methods, it had a rude awakening, according to William Wiggenhorn, corporate vice president for training and education. "They couldn't read. They couldn't do simple arithmetic like percentages and fractions. At one plant, a supplier changed its packaging, and we found in the nick of time that our people were working by the color of the package, not by what it said."

Thus, Motorola found that before it could train its employees, it would have to teach them math and English, says Jim Frasier, Motorola University's manager of retraining programs. The company set a goal that by the end of 1992, all U.S. workers would have to meet two criteria: the ability to read and write at the ninth grade level and the ability to do math at the eighth grade level.

These twin efforts, remedial education and lifelong training, were dubbed Motorola University in 1989. Susan Hooker notes that Motorola is deeply committed to lifelong training, and the company backs this commitment with an annual investment of $120 million in Motorola University.

The company is on track towards meeting its goals, says Frasier. Hooker adds that all the workers at three of the company's U.S. factories have met the criteria. In addition, the company has seen what kind of impact this upgrading of skills has had. Over the two-year period in which training has taken place, Motorola's cellular telephone manufacturing plant has seen a 30 to one reduction in cycle time (the time between placement of an order and delivery to the customer), a 10 to one improvement in quality, and a five-fold increase in the levels of employee productivity that had been predicted for the factory. These improvements were due to both training and to good workplace design, notes Frasier. Frasier says Motorola's investment in training and education will give the company a strategic edge in the 1990s. "People will want to work for us and to stay with us because we provide lifelong learning." ■

ficer of Xerox, who was recently nominated to be deputy secretary at the U.S. Department of Education.

A Lifetime of Learning

Thus, the issue is not just competing for the best people in an increasingly limited labor pool. Constant education and retraining of a company's current work force has become a key to competitiveness. While the 1980s was the decade of quality, during which companies focused on improving the quality of their products and services, the 1990s will be "the decade of people," says Jim Frasier, manager of retraining programs at Motorola University.

A few companies are trying to improve their workers' skills. Motorola was among the first to recognize the strategic importance of education and training, starting a corporate training center in 1982 that later grew to be Motorola University. Susan Hooker of Motorola University notes that 75 percent of Motorola's present work force will be with the company in the year 2000, and without a well trained work force, "we won't be in business."

Other corporations also recognize the importance of a well-trained work force. American Express' success with its Academy of Finance has given birth to a number of such academies in various industries. (See sidebars.) New York Telephone has set up four technology-learning centers where employee skills are upgraded.

These companies have realized that they have little choice but to invest in training and education to help their work force learn the skills that business needs. The alternatives, as listed in the government's report on the quality of the work force, are simply unacceptable:

- employ under-qualified workers, which could result in inferior product quality, thus reducing American companies' ability to compete in the global marketplace;

- competitively seek out qualified workers already employed in other companies, thus driving up the wage scales and reducing American companies' price competitiveness; or

- take the jobs elsewhere, thus reducing American job opportunities and eroding the U.S. economic base.

Superstock

But large expenditures to remediate and train workers should not be looked at as a cost, but rather an investment that is even more important than investments in capital equipment.

According to William H. Kolberg, president of the National Alliance of Business, "The last frontier of international competition, I submit, is the work force. It's the one component we can't export or import with ease and quantity. Those nations that build the best educated and trained work forces into internationally competitive skill forces, will draw the high-skill industries and thus enjoy the higher standards of living." Adds Kolberg, the way companies manage their human resources is becoming a critically important business strategy. ■

Agenda

CIO PERSPECTIVES

Dr. Robert A. Zawacki

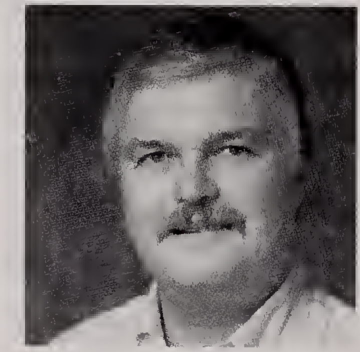
Alan R. Fusfeld

Raymond J. Lane

Mitchell Fromstein

John Roach

Susan P. Hooker


Thomas L. Williams

Michael Behar

SUNDAY, SEPTEMBER 22

2:00PM–6:00PM	Conference Registration
7:00PM–9:00PM	Reception

MONDAY, SEPTEMBER 23

7:00AM–8:00AM	**Continental Breakfast**
8:00AM–8:30AM	**Welcome & Opening Remarks** Joseph L. Levy, *President & Publisher CIO Publishing, Inc.* **Conference Overview** Conference Moderator: Alan R. Fusfeld *CEO, Generics North America*
8:30AM–9:15AM	**The Organization and Technological Change: The Human IS Response** Dr. Robert A. Zawacki, *Professor of Management & Organizational Behavior University of Colorado*
9:15AM–10:00AM	**Vegetables Before Dessert: Facing Up to IT Realities** Raymond J. Lane, *Senior Vice President Booz Allen & Hamilton*
10:00AM–10:30AM	**Coffee Break**
10:30AM–11:45AM	**The Next CIO Contribution: Solving the Workplace Skills Crisis** Panel Moderator: Michael Behar, *President & CEO, University Communications* Mitchell Fromstein, *Chairman and CEO Manpower, Inc.* John Roach, *Chairman, President and CEO Tandy Corporation* Susan P. Hooker, *Director of Planning, Retraining, and External Affairs, Motorola University* Thomas L. Williams, *President Elect California Council for Alternative Education*

IT AND THE CORPORATE AGENDA: PEOPLE, PRODUCTIVITY AND PROFIT

MONDAY, SEPTEMBER 23 (continued)

11:45AM–1:00PM	Luncheon & Presentation **People-Centered Productivity: Turning Down Time into Dollars** Graham C. Beachum, Jr., *Vice President & General Manager, Tandon North America*
1:30PM–6:30PM	Networking & Affinity Groups
6:30PM–7:30PM	Reception
7:30PM–10:00PM	Dinner

TUESDAY, SEPTEMBER 24

7:00AM–8:00AM	Continental Breakfast
8:00AM–8:45AM	**Connections: The New Social Contract for the 21st Century** Panel Moderator: Robert S. Russell, *Vice President, Marketing, AT&T Network Systems* Peter Moore, *Managing Partner Inferential Focus* Dan Stanzione, *President, Operations Systems AT&T Network Systems*
8:45AM–9:30AM	**Forging Closer Bonds With Employees and Customers** John W. Biggs, *Senior Vice President Hyatt Hotels Corporation*
9:30AM–10:15AM	**The Formula for Productivity: Putting Information in Usable Form** Peter J. Schuyten, *Editorial Director Dow Jones News Retrieval*
10:15AM–10:45AM	Coffee Break
10:45AM–11:25AM	**How To Compete on Leadership Alone** Stuart Reeves, *Senior Vice President & Member Board of Directors, EDS*
11:25AM–12:05PM	Concurrent Sessions (4) **The Power Crisis and Its Impact on Computing Environments** Joe Binder, *Vice President, Marketing Exide Electronics*

Graham C. Beachum, Jr.

John W. Biggs

Peter Moore

Stuart Reeves

Peter J. Schuyten

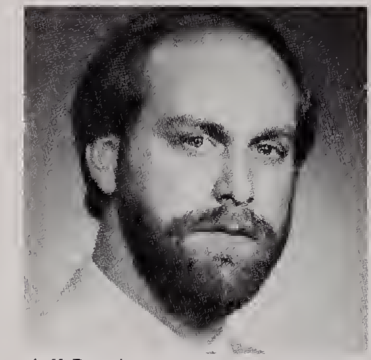
Dan Stanzione

Joe Binder

Robert S. Russell

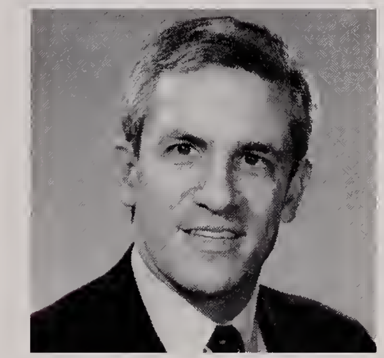
Agenda

Frank Gens

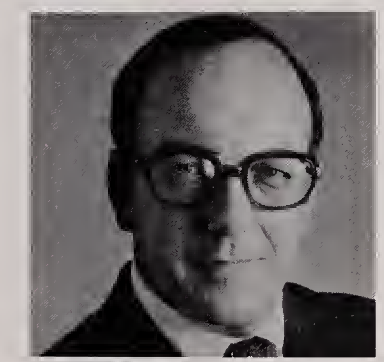

Jeff Brooks

Fred Sammet

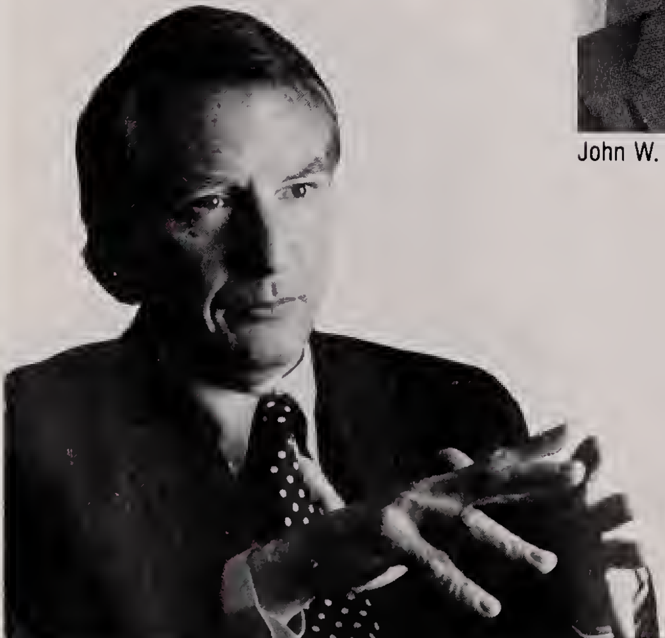
David A. Kyzer


Alan Paller

Clint Kreitner


Lewis E. Platt

John W. White


Tom Peters

TUESDAY, SEPTEMBER 24 (continued)

	Rapid Technology Exploitation Strategies: Profiting from the Open Systems Upheaval Frank Gens, *Vice President, Technology Assessment, Technology Assessment Strategies Corporation*
	EDI: Building Bridges, Breaking Barriers Jeff Brooks, *President, Brooks Associates* Fred Sammet, *President Interlink Resource Group*
	IT Value Leading to Enterprise Excellence David A. Kyzer, *Vice President of Development Consulting Services, EDS*
12:05PM–1:00PM	**Luncheon**
1:00PM–1:45PM	**EIS: Improving Productivity or High Tech Gadgetry?** Alan Paller, *President, AUI Division Computer Associates International* Clint Kreitner, *President Reading Rehabilitation Hospital*
1:45PM–2:30PM	**Information Technology: The Cornerstone of Time-Based Competitiveness** Lewis E. Platt, *Executive Vice President Computer Systems Organization Hewlett-Packard*
2:30PM–3:00PM	**Using Information Technology to Reengineer the Business Process** John W. White, *President, Information Technology Group, Texas Instruments*
3:00PM–3:30PM	**Coffee Break**
3:30PM–5:30PM	**Create and Destroy: When "Getting It Wrong the First Time" Pays Off** Tom Peters, *President, The Tom Peters Group*
5:30PM–6:30PM	**Reception with Tom Peters**

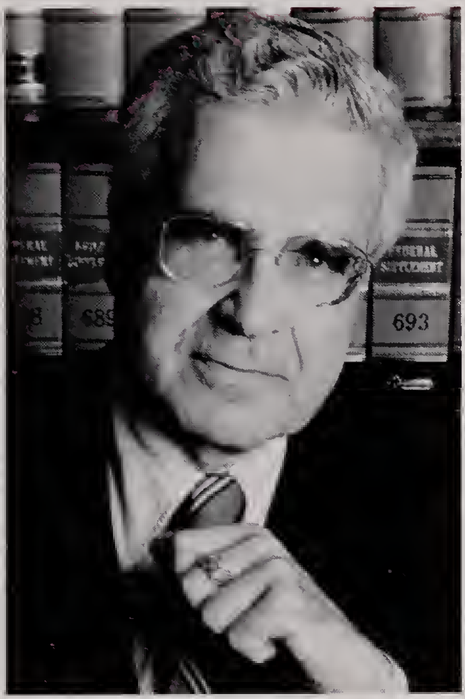
SEPTEMBER 22-25, 1991 HYATT REGENCY, MONTEREY, CALIFORNIA

WEDNESDAY, SEPTEMBER 25

7:00AM–8:00AM	Continental Breakfast
8:00AM–8:45AM	Employee Privacy versus Corporate Privilege Arthur Miller, Esq., *Bruce Bromley Professor of Law, Harvard Law School*
8:45AM–9:25AM	Concurrent Sessions (4)
	Open Systems: Beyond the Blueprint—Starting to Build William N. Bonin, *Director of Open Systems Development, Hewlett-Packard*
	CASE Trends and Impact Lawrence L. Howard, *Director, Worldwide Sales & Marketing, Advanced Information Management Division, Texas Instruments*
	Bringing Top Service to Your Bottom Line Al R. Mascha, *Vice President, Worldwide Customer Service & Support, Hitachi Data Systems*
	You Can't Work in the Dark: Sourcing Strategies for Enterprise Systems Management George Kurtz, *Senior Consultant, Computer Associates; Author, "You Can't Work in the Dark! Understanding Automated Data Center Operations"*
9:25AM–10:05AM	Workforce Diversity: Successfully Managing Tomorrow's Team Fred Hansen, *Executive Vice President Administration, Hitachi Data Systems*
10:05AM–10:35AM	Coffee Break
10:35AM–12:15PM	The New American Paradigm: Developing a Creative Corporate Culture Mike Vance, *Chairman & Co-Founder Creative Thinking Association of America*
12:15PM–12:30PM	Summary

TO ENROLL, CALL 800-366-0246

William N. Bonin


Arthur Miller

Lawrence L. Howard

Al R. Mascha

George Kurtz

Fred Hansen

Mike Vance

Companion Program

This program has been designed to provide activities for your companion while you participate in the conference. As you're attending the sessions, your companion can experience the surrounding attractions and enjoy the natural beauty of Monterey.

Registration in the companion program is required for those wishing to participate in the meals, planned functions, and/or tours during the conference. These include the Sunday night reception; Monday breakfast, lunch, tour, reception, and dinner; the Tuesday breakfast, lunch, tour, reception; and Wednesday breakfast.

Monday morning, a get-together for companions has been scheduled to meet new friends and renew acquaintances from the previous conferences. We look forward to meeting all of you (or seeing you again), and know that you will enjoy the program and activities.

David Burghardt, Island Photography

SUNDAY, SEPTEMBER 22	
7:00PM–9:00PM	Arrival Reception
MONDAY, SEPTEMBER 23	
8:30AM–9:30AM	Continental Breakfast
11:45AM–1:00PM	Luncheon with all Conference Participants
1:30PM	Bus will depart from Hotel Reception Center for Monterey Bay Aquarium, Cannery Row, Wine Tasting and Shopping at the American Tin Cannery
5:00PM	Return to Hyatt Regency
6:30PM–7:30PM	Reception
7:30PM	Dinner
TUESDAY, SEPTEMBER 24	
7:00AM–8:30AM	Continental Breakfast
10:00AM–3:00PM	Bus will depart from Hotel Reception Center for Monterey Peninsula Tour, Monterey Waterfront, Fisherman's Wharf, Pacific Grove Waterfront, 17-Mile Drive through Pebble Beach with a stop at the Lodge.
11:30AM–1:00PM	Luncheon, Plaza Cafe, Carmel
1:00PM–3:00PM	Carmel Mission Tour
3:00PM	Return to Hyatt Regency
6:30PM	Reception
WEDNESDAY, SEPTEMBER 25	
7:00AM–8:30AM	Continental Breakfast

Del Monte Golf Course

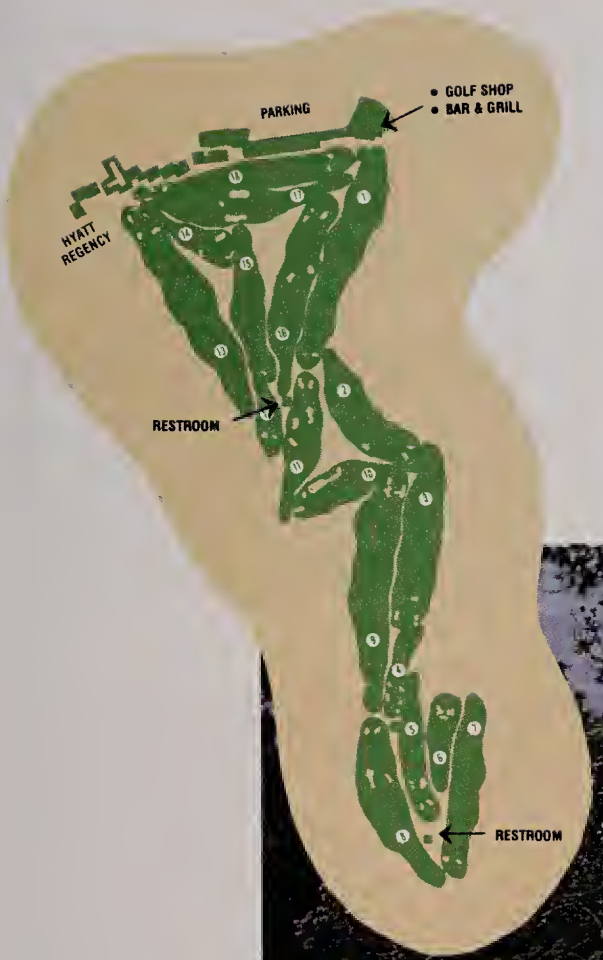
Old Del Monte is the oldest golf course west of the Mississippi. Built in 1897, its gentle greens make it by far one of the most beautiful courses on the Peninsula.

While the greens have since been redesigned, they maintain their challenge. Small greens, sand bunkers and narrow fairways lined with Monterey Pine and California Live Oak will inspire the most avid golfer.

Del Monte Golf Course is the annual site of the California Amateur Tournament, and has also hosted the Spalding Pro/Am Tour.

On Monday, September 23rd, we will host a shotgun start tournament. There will be three tournament holes—hole-in-one, longest drive, and straightest drive. There will also be awards for individual and team low nets, and individual low gross.

Participation in the tournament is $110 per player and includes the round, cart rental, use of practice tees, amenities and prizes. If you plan to play in the tournament, be sure to complete the information regarding your shirt size and golf handicap on the enrollment form.



Corporate Hosts

AT&T
Network Systems

AT&T Network Systems

As a major business group within AT&T, AT&T Network Systems is one of the world's leading developers and manufacturers of products and systems for telecommunications. AT&T Network Systems provides telecommunications service providers in approximately 70 countries with virtually everything they need to build and operate their networks. Product quality results from the unmatched research and development capabilities of AT&T Bell Laboratories, as well as the standards of reliability associated with Western Electric products.

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Dow Jones Information Services is the electronic publishing arm of Dow Jones & Company, Inc. Although formally organized in 1980, Dow Jones Information Services actually began more than a century ago with Dow Jones News Service (commonly known as the Broadtape). Today, Information Services publishes or produces four other realtime newswires; Dow Jones News/Retrieval, the leading on-line source of business and financial news and information; Dow Jones Voice Information Services (including DowPhone and JournalPhone); and DowVision, an information service that delivers customized business news and information through our high-speed network to desktops in corporate America. Dow Jones Information Services also produces syndicated business radio and television programming, and publishes portfolio management and investment software.

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EDS is a leading provider of information technology services to businesses and governments worldwide. The company is headquartered in Dallas, employs more than 60,000 people and had revenues over $6 billion in 1990. EDS' services include consulting, systems development, systems integration and ongoing systems management.

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Exide Electronics

Exide Electronics is the largest dedicated developer and manufacturer of on-line uninterruptible power systems (UPS) and services. The Company serves a broad range of businesses and institutions worldwide. Its power protection systems are used to safeguard mission critical applications in financial, medical, industrial, telecommunications, military and aerospace organizations — wherever continuous power is essential to daily business operations.

Hewlett-Packard
Hewlett-Packard Company is an international manufacturer of measurement and computation products and systems recognized for excellence in quality and support. The company's products and services are used in industry, business, engineering science, medicine and education in approximately 100 countries. HP has 92,000 employees and had revenue of $13.2 billion in its 1990 fiscal year.

Hitachi Data Systems Corporation (HDS)
Hitachi Data Systems Corporation (HDS) is a joint venture company owned by Hitachi, Ltd. and EDS. The company markets a broad range of mainframe systems, peripheral products and services. Headquartered in Santa Clara, California, HDS employs 2600 people and maintains more than 100 offices worldwide.

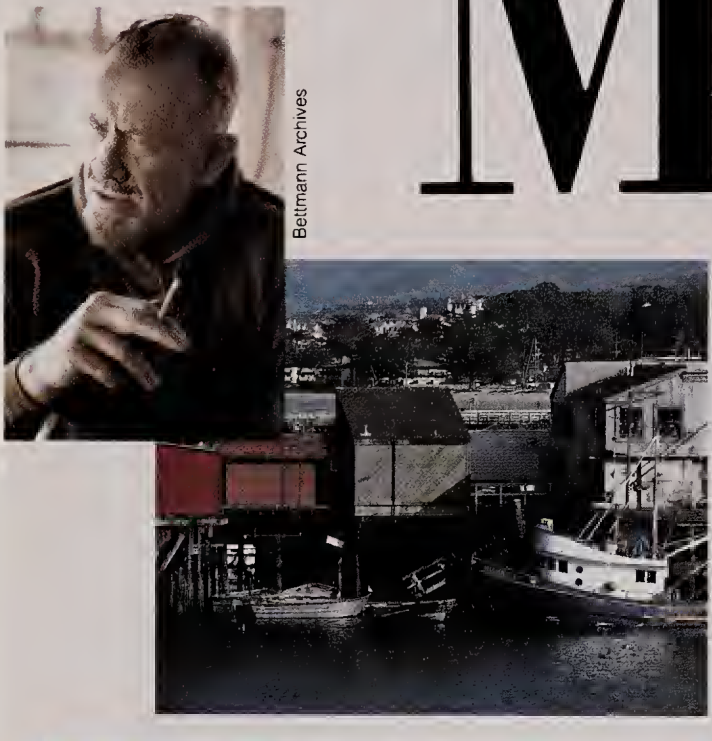
Tandon Corporation
Tandon Corporation designs, manufactures, supports and services IBM-compatible business and professional personal computer systems marketed worldwide under the Tandon brand name. Incorporated in 1976, Tandon Corporation has been an integral part of the microcomputer industry since its beginning. Tandon has had three progressive growth phases: first, 1976–1979, as the world's largest producer of magnetic recording heads for disk drives; second, 1979–1985, as a leading supplier of complete disk drives for IBM, Tandy and other well-known personal computer makers; and since 1985 as a producer and marketer of its own brand name personal computer systems.

Technology Investment Strategies Corporation
Technology Investment Strategies Corporation, a subsidiary of International Data Group (IDG), offers clients worldwide a comprehensive set of research products and consulting services for both open systems and proprietary computing platforms. Our company is differentiated by a unique consultative approach, which emphasizes responsive client service and proactive consulting tailored to individual client business requirements. Services are designed to help MIS executives make informed strategic planning decisions and leverage their technology investments effectively.

Texas Instruments
Texas Instruments is a high-technology corporation engaged in the worldwide development, manufacture, and sale of semiconductors, defense electronics systems, computer and software systems, electrical controls, industrial automation control systems, metallurgical materials, and consumer products. At Texas Instruments, technological leadership and a persistent commitment to quality have been the keys to success.

Xerox
Recipient of the 1989 Malcolm Baldrige National Quality Award, Xerox is a multinational company in document processing. The business products and systems activities encompass the designing, developing, manufacturing, marketing and servicing of a complete range of document processing products and systems that make knowledge workers more productive. Xerox digital production publishing systems, copiers, duplicators, electronic printers, optical scanners, networks, workstations, and related products, software, and supplies are marketed in more than 130 countries.

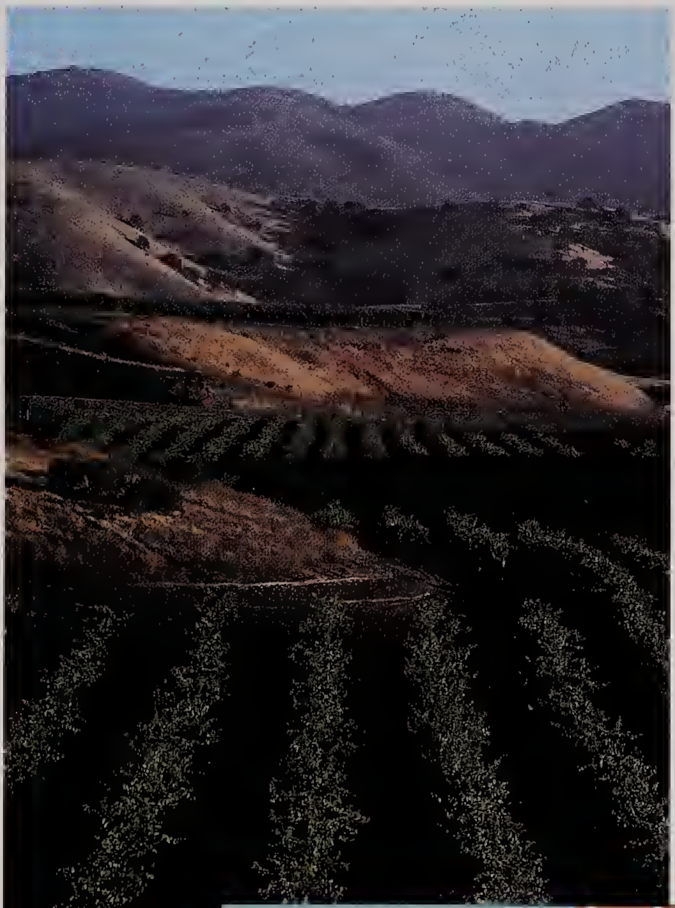
Monterey Bay Area Activities



Bettmann Archives

Monterey Peninsula boasts a spectacular coastline and over a 400-year history. Central to the whaling and sardine industries from the 17th through the 19th centuries, the Peninsula was an important part of the commercial, political and governmental lives of its inhabitants. Today the Monterey Peninsula is home to artists and poets, some of the world's most challenging golf courses, historical explorations, exquisite scenery, museums, wineries, shops and fine dining.

Immortalized by novelist John Steinbeck, Cannery Row was once the world's sardine capital. In the late 1940's the sardines disappeared, but a decade later Cannery Row was revitalized. Fine restaurants, art galleries, antique shops, nightclubs and specialty stores are housed in the former sardine processing factories. The American Tin Cannery, home to 45 factory outlets, is the finest outlet shopping in the area. Fisherman's Wharf is also rich in history and excitement, and a great location to watch the seals sunning themselves.



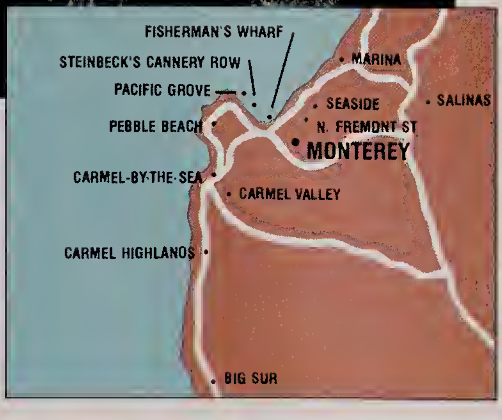
Craig Lovell, Eagle Visions

The Monterey Museum of Art is home for such artists as Edward Weston, Ansel Adams, Donald Teague and Charles Russel. In Carmel Village there are various art galleries such as Hanson Galleries, housing one of the most extensive collections of important modern paintings and rare prints featuring Picasso, Chagall, Miro, Dali, Rothe, and Neiman.

The Monterey Bay Aquarium is one of the largest aquariums in the nation. Its many galleries and exhibits explore the marine region of the Bay. You'll see otters, sharks, wolf-eels, starfish and the towering three story California Kelp Forest, the tallest exhibit in the United States.

Private winery tours and tastings will introduce the art of winemaking and the innovative methods winemakers are using to create distinctive wines from remarkable California grapes.

The 17-Mile Drive, perhaps the most scenic roadway in America, weaves through the residential community of Pebble Beach. Within this 5,300 acre preserve, protected and nurtured since 1919, are lush gardens and magnificent homes, as well as towering pines, cypress trees, craggy rocks and a spectacular coastline populated by seals, sea lions and otters.



Big Sur's majesty is awesome and inspiring. Pounding surf can be heard from cliffs 1,000 feet above the ocean floor. Nothing compares with the majestic view of the Pacific Ocean from Carmel River to the southern Monterey County line.

From Monterey access to any activity is easy. Come and experience the delights of this coastal paradise with us.

CIO
THE MAGAZINE FOR INFORMATION EXECUTIVES

CIO Perspectives IT and the Corporate Agenda: People, Productivity and Profit

Enrollment Form

—— Hyatt Regency • Monterey, California ——

☐ **Yes!** Please register me/us for *CIO* Magazine's three-day executive conference, Sept. 22–25, 1991, at the Hyatt Regency, Monterey, California. I understand that full payment officially confirms my registration.

Name ____________________
Title ____________________
Company ____________________
Address ____________________
City ____________ State ________ Zip ________
Phone (   ) ____________ FAX (   ) ____________
First Name for Badge ____________ (Name of Companion if attending) ____________
Signature ____________________

Additional Company Enrollments

Please also register the following individuals from my company. For additional enrollments, photocopy this page.

Name ____________________
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Division ____________ Companion Name ____________

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Just complete and fax this form to 508-872-0618, Attn: Lynda Rosenthal.

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492 Old Connecticut Path, Suite 200
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REGULAR ENROLLMENT FEES

Individual: $995 ($875 if payment received by 7/12/91)

Group: $895 ($850 if payment received by 7/12/91) (Group = 3 or more registrations from same company registering at the same time.) *Please note cancellation policy.*

All enrollment fees must be paid in advance of the meeting. Fee includes conference materials and scheduled food and beverage. Transportation and hotel are the responsibility of the participant. We reserve the right to limit the number of participants.

PAYMENT INFORMATION

☐ This is an early enrollment (payment prior to 7/12/91)
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CONFERENCE ATTIRE

Since it is our intent to create an informal, relaxed setting throughout the conference, casual attire is strongly suggested. California evenings can be cool, so we recommend that you bring a sweater or jacket.

COMPANION ENROLLMENT

$165 (includes all scheduled food and beverage functions and tours).*

GOVERNMENT/MILITARY FEES

Individual: $1,350 ($1,250 if payment received by 7/12/91)

All enrollment fees must be paid in advance of the meeting. Government/Military fee includes conference materials, scheduled food and beverage, AND standard hotel room at the Hyatt Regency for the nights of September 22, 23 and 24.

CANCELLATION

You may cancel your enrollment up to 30 days prior to the conference and receive a full refund. For cancellations made between 29 and 11 days prior to the conference there will be a $400 charge. If you cancel within 10 days of the conference or do not attend, no portion of the enrollment fee is refundable. All cancellations must be made in writing. Also, it is your responsibility to cancel your hotel accommodations and transportation arrangements.

HOTEL ACCOMMODATIONS/ TRANSPORTATION

A block of rooms has been reserved for conference participants. We urge you to make your reservations early with the Hyatt Regency at 800/233-1234 (within CA, 800/824-2196). Be sure to identify yourself as part of the *CIO Perspectives* conference to receive the conference rate. Hotel reservations/cancellations and charges are your responsibility. Shuttle transportation will be provided by the hotel to/from Monterey Airport and is included in your room charge.*

Arrival/Departure Times
Please indicate arrival and departure plans below:

Arriving on: ___ Friday, Sept. 20
___ Saturday, Sept. 21
___ Sunday, Sept. 22
Departing on: ___ Tuesday, Sept. 24
___ Wednesday, Sept. 25
___ Other ____________ (specify date)

GOLF TOURNAMENT

A shotgun start golf tournament on the renowned Del Monte Golf Course will be held on Monday afternoon. The cost to participate is $110 and includes the round, cart rental, use of practice tees, amenities and prizes. If you wish to participate, complete the following:

Shirt Size S M L XL XXL Handicap ______

FLIGHT INFORMATION

American Airlines and USAir are the Official Conference Carriers. Depending on your originating city, you can qualify for up to a 45% discount through the special conference fares established. To receive this discount, call: American Airlines Meeting Services Desk toll-free at 800-433-1790 and reference STAR File S05914S or USAir's Meetings office toll-free at 800-334-8644 and reference Goldfile 39600000.

Please keep a copy of this form if registering by mail

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* No credit will be given if you do not use this service.

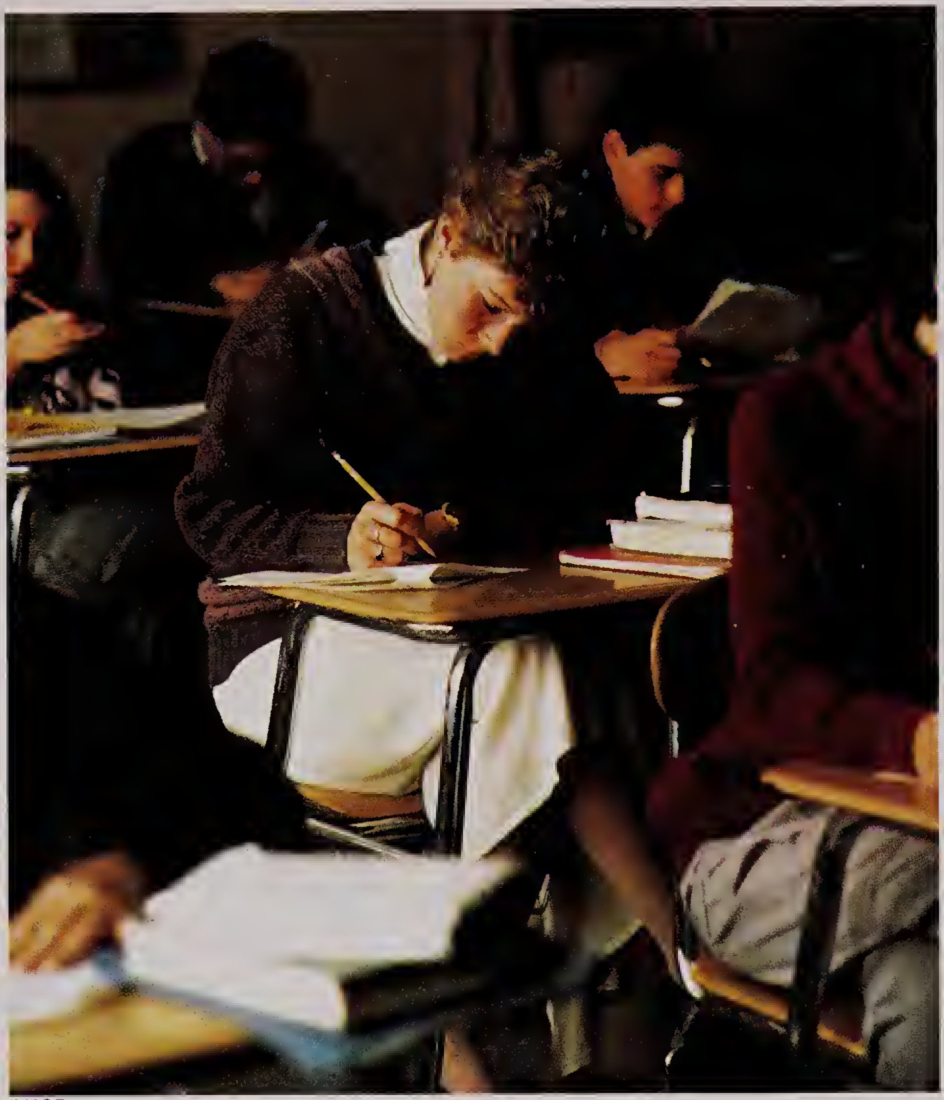


IMAGE BANK

Academy Concept Flourishes

As more and more companies have recognized the growing skills shortages in their industries, they have begun to band together to offer training and internships to high school students in an effort to recruit and prepare new entry-level workers. The National Academy Foundation, a non-profit organization, was founded in 1989 to encourage and support these efforts. The Foundation grew out of the success of the Academy of Finance, which was started in 1982 by American Express Company, Shearson Lehman Hutton, and the New York City school system. The Academy is a two-year program combining class-room instruction with on-the-job experience for high school juniors and seniors. In addition to their regular classes, the students take courses in economics and finance and attend seminars. Between their junior and senior years they work as paid interns at financial services firms.

Today, the Academy of Finance is in 45 schools in 22 cities, with a total enrollment of more than 2,600 students. The National Academy Foundation has since started academies in three other industries: travel and tourism, public service, and manufacturing sciences. For more information, contact the National Academy Foundation, 660 Madison Avenue, Suite 1804, New York, N.Y. 10021; phone 212-754-0040. ■

TRENDLINES

CAREER MOVES

Covia Corp.'s MARK TEFLIAN is leaving his post as CIO to become president of a new Covia subsidiary. Covia Technologies will sell systems developed by the airline reservation and airport management company. Covia, based in Rosemont, Ill., is co-owned by the parent companies of United Airlines and six other airlines.

JONATHAN J. BURBANK has been named vice president for U.S. Information Services of Bull HN Information Systems Inc., of Billerica, Mass. Burbank will develop and direct business and technical information systems for Bull in North America and coordinate activities with Canada, Mexico and Zenith Data Systems Corp. He will also be responsible for assuring strategic and tactical alignment of his group's IS endeavors with Groupe Bull's worldwide IS strategies.

National Amusements Inc., the Dedham, Mass., owner and operator of the Showcase Cinema chain, has promoted STEPHEN SOHLES to vice president of MIS. Sohles, who has been with the company since 1985 as director of MIS, will expand his role to include involvement in overall management planning.

First Bancorporation of Ohio, based in Akron, has appointed WILLIAM EAGER to the post of executive vice president and senior operations officer. He has also been named the managing officer of FBOH Services Division, the corporation's data-processing subsidiary. He has been with the company since 1987, most recently as senior vice president. In addition to his role at First Bancorporation, Eager is secretary and a founding member of the Northeast Ohio chapter of the Society for Information Management.

INDUSTRY FORECAST

HAPPYISH DAYS ARE HERE AGAIN

While home sales plummet, S&Ls go belly-up and new cars gather dust in showrooms, even middling signs of economic life are welcome news these days. So a survey indicating that the 1991 U.S. IT industry will post modest growth may be cause enough for vendors to start whistling "Happy Days Are Here Again."

International Data Corp. of Framingham, Mass., recently polled over 1,800 U.S. corporate IT users regarding their short- and long-term spending plans. Although the results suggest that most vendors should nip their double-digit growth projections firmly in the bud, the PC industry has reason to celebrate the findings. The survey projects a six percent overall growth rate for 1991—certainly not a boom, but positively rosy when compared to other industries.

A mere 28 percent of the respondents said that their organizations were "essentially saturated with PCs," which translates into an opportunity for the PC market to expand. As far as buying is concerned, only 22 percent of the respondents said that they were delaying or slowing any IS purchases due to the weak economic climate. While 17 percent of respondents said that their IS budgets for the upcoming year will decrease, this figure is consistent with previous annual surveys. The most important factor in making budget decisions was current corporate performance (mentioned by 76 percent), followed by corporate desire to control IS spending (52 percent). Forty percent of the respondents cited both pressure from competitors and the recession as important factors when it came to deciding whether or not to open the corporate checkbook.

Some surprising trends were uncovered regarding major IT customer issues in the 1990s. Nearly half of the respondents said they are moving, or would like to move, to client/server computing, yet only 15 percent are either currently using, or are interested in using, the services of systems integrators. Outsourcing is considerably more popular than in the past, with about 22 percent actively pursuing, or considering pursuing, that option. And IDC detected no dominant pattern of movement toward centralized or decentralized MIS organizations.

ILLUSTRATION BY DIANNE BENNETT

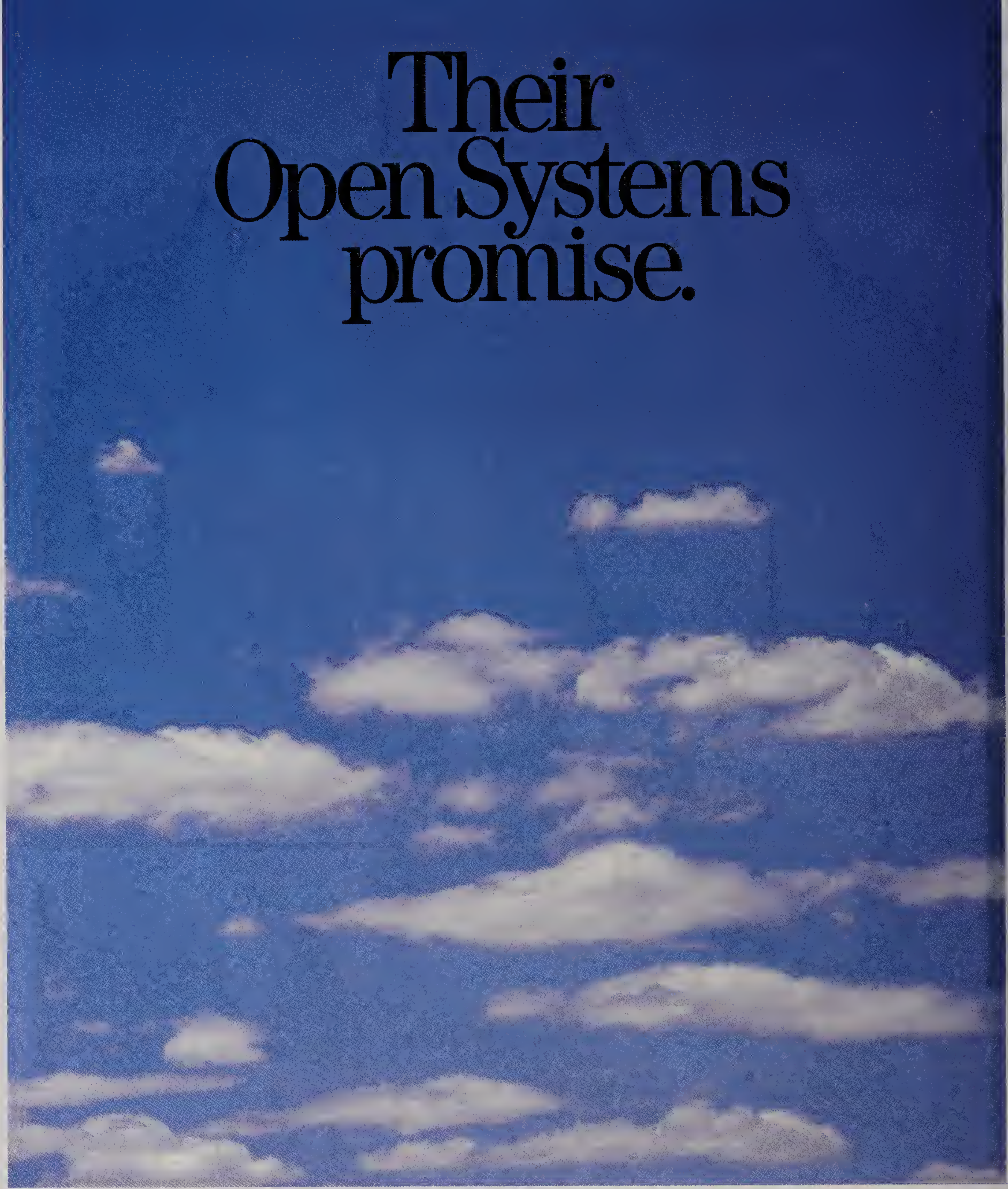
DIGGING UP A NEW USE FOR HAND-HELDS

Armed only with a map and a pistol, Indiana Jones beat the Nazis to the Ark of the Covenant. Imagine what he could have done with a hand-held computer.

Thousands of miles from Hollywood, real-life archaeologists are using such high-tech equipment in their search for the artifacts of centuries-old cultures. At a dig site in Jordan, hand-held radio frequency computer terminals were field-tested in 115-degree heat, 600 feet below sea level. "I purposely treated the terminal roughly just to see if it would survive the treatment, and it did," said James Flanagan, co-director of the Tell Nimrin Excavation.

The terminals, provided by Norand Corp. of Cedar Rapids, Iowa, use radio frequency to transmit data to a host computer, providing real-time tracking of information. "A high percentage of archaeological work is recordkeeping," Flanagan said. "Obviously, when you excavate, you don't know what you're going to find. Once you've excavated, it's too late to put it back. So you record everything as you go."

A more exciting use for the terminals may be back at the lab, where archaeologists begin the task of identifying artifacts' role in the culture. "We aren't yet satisfied that we have realized [the equipment's] full potential," said Flanagan.



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of delivering standards-based systems. A dedication to networking standards, from LANs to WANs. And a family of RISC-based computers offering unmatched scalability from desktop models to multiuser systems.

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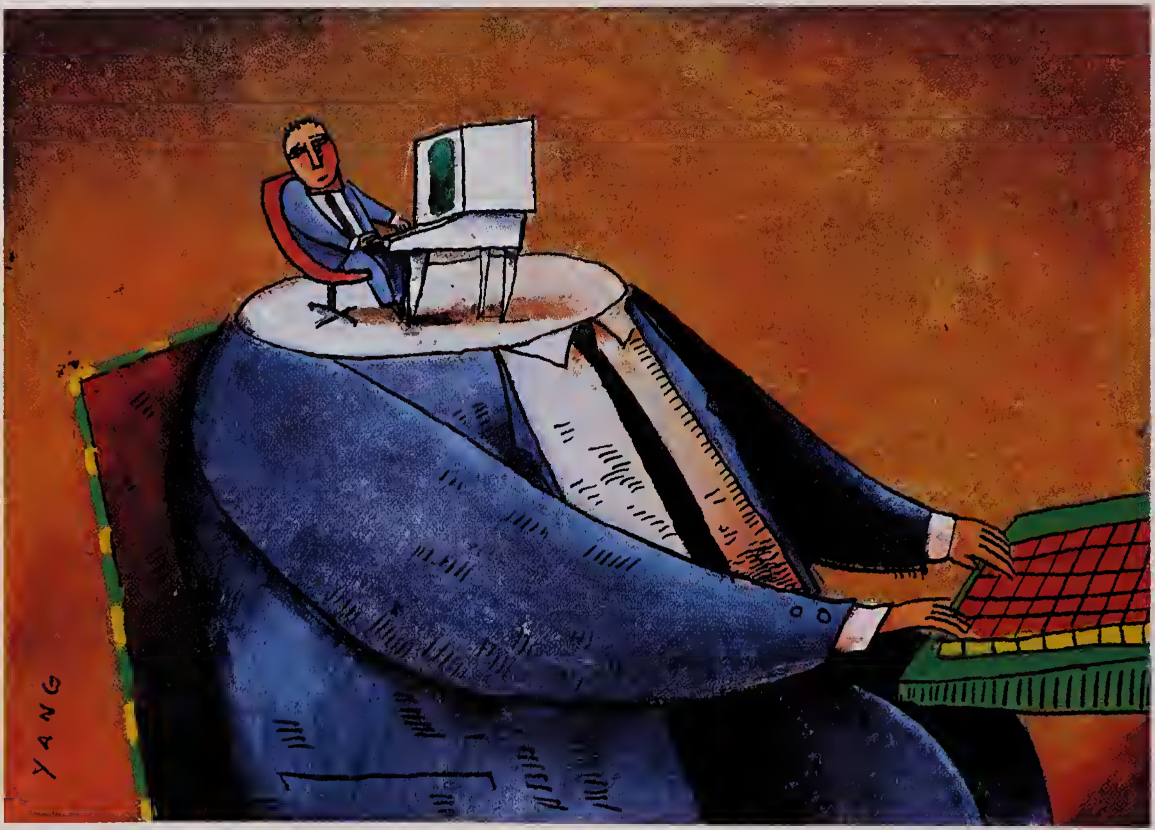
Thinking of Downsizing?

Moving applications to a distributed platform can help companies cut costs and achieve greater flexibility. But CIO beware: Downsizing the wrong systems can put your organization at risk.

BY THEODORE P. KLEIN

Many firms today are downsizing mainframe-based IS applications and taking advantage of distributed workstation and LAN technologies to support critical lines of business. The potential benefits of downsizing are clear: lowered costs, improved response, greater control and maximum flexibility—not to mention the ability to better-integrate business information within mission-critical workgroups. However, the decision to downsize an application to a networked platform or to leave it mainframe-resident typically raises complex issues of technological benefits, management value and real business risk.

Downsizing decisions need to be made on an application-by-application basis. There must be a non-political process to select suitable projects. One major consideration is whether or not the application will advance business unit goals that are consistent with the overall systems direction of the organization and the risk it is willing to accept.



It can be helpful to have a checklist of business criteria that takes into account the candidate applications' scope, database size and access requirements, functional autonomy, response time, level of user sophistication, securability and interruptibility. Only a thoroughgoing evaluation of these factors can ensure that the downsizing decision does not put a critical line of business at risk or result in costly technology errors.

Consider the first item on the checklist: Is the business scope of the application you are evaluating departmental, divisional or enterprisewide? An enterprisewide system is characterized by a broad corporate requirement for shared data and functionality, multisite locations, significant database size, extensive interprocess communications and high throughput. Such systems are mission-critical. Divisional and departmental information systems exhibit lesser scope and correspondingly greater requirements for focused information processing in the support of specific functions.

Given a mainframe-oriented IS organization and an existing mainframe application (and all other things being equal), the broader the audience the application serves, the greater the likelihood that it should remain mainframe-resident. Conversely, the smaller its scope, the lesser the risk in downsizing it. However, an enterprisewide system is no more synonymous with mainframe computing than divisional is with mid-range, or departmental with workstation/LAN. Additional influencing factors might include a firm's organizational climate, structure, propensity for risk, IS strategy and the degree of decentralization pressure exerted by senior executives and line management.

In assessing database size and access requirements, assume you're

ILLUSTRATION BY JAMES YANG

going to downsize. Then consider how many "external" personnel still require access. What's the volume of data they'll require? How timely must that data be? What's the overall database size?

Once downsized, an application system will generally be resident, operate and execute on LANs within the division or department that it supports. However, others in the organization may still need access to the system or its data. The more external personnel that require this access and the more often they need it, the less appropriate it is to downsize the application. Likewise, if significant components of the system are required by external users or substantial consolidation of its data is required, it may not be a strong candidate for downsizing.

A need for instantaneous, real-time data may also suggest staying with a mainframe platform, which can support the sophisticated interfaces, data communications and fast networks such access requires. Should instantaneous communication be required and downsizing is still desired, some form of tested, reliable, secure and effective network communications absolutely must be in place.

The database's size is also a factor. As file servers and networks grow in capacity and throughput, this becomes less of an issue. Applications with upwards of 1 gigabyte of data have been successfully downsized onto file servers, but anything above that generally requires more sophisticated access methods, communications and database architectures.

Future functional modification and database expandability should also be considered. The application must be able to continue operating successfully on the chosen platform in the future.

Another important factor is whether the application is functionally autonomous. The greater the need for the application to communicate, interact or connect with other systems or users (and given that all other systems are mainframe-resident), the more likely it is that it should remain mainframe-resident. Conversely, the greater the functional autonomy, the smaller the downsizing risk.

Downsizing decisions need to be made on an application-by-application basis.

The time required to complete a function executed by the user is also important. The shared processing requirements imposed on host-based applications often result in slowed response times. Performance may be inconsistent and cannot be directly controlled by the user. If this is unacceptable, the application should operate locally on its own processor.

Another question: How familiar with workstation/LAN technology are users and supporting staff? The ability of line and functional managers or systems personnel within the business group to effectively manage and administer the system is essential to the success of any downsizing effort. An application supporting the business activities of a user group with no technical background and little understanding of technical issues—and no desire to acquire these skills—should probably be left in a mainframe environment.

Determining whether the system will store highly confidential data is critical. Workstation/LAN-based systems usually provide less physical security and are easy to log into and gain database access. Operating software may be far less secure, and passwords are frequently shared and posted. Malicious intervention is always possible. Unguarded telecommunications connections are also security weaknesses. The degree to which confidential data is contained, then, may suggest a need for greater physical as well as technical security. While this is not an absolute recommendation for a mainframe platform, it's an important influencing factor.

Finally, the IS executive must consider what level of system failure can be tolerated and across how many users. And what about customers, distributors and suppliers?

Maximized mean time between failures will most likely be achieved with a mainframe implementation. Redundant hardware and communications processors and sophisticated software techniques all provide an extremely high level of comfort. Experienced operator and technical support personnel, all well-drilled in professional support techniques, imply that even if partially disabled, the system can continue to run.

However, not all systems require fault-free operation. Applications for which uptime is less critical can be deployed—with low business risk—on workstations and LANs.

Other factors influence the decision to downsize. User satisfaction, development cost, implementation risk, competitive benefits, responsiveness to change and deployment flexibility can all confuse the issue.

The trick is to gain consensus on the criteria and weight them against strategic IS principles, best espoused by senior IS and business executives. Measure each of your downsizing candidates against the criteria; applications with high risk are best left on the mainframe for now, while those that are less mission-critical are prime downsizing candidates. With this method, you can gradually and successfully distribute applications and gain experience at minimal risk.

A firm's success in implementing a consistent, effective and beneficial downsizing strategy thus depends on IS's ability to provide leadership; build a consensus at all levels of management on downsizing risk versus value; create uniform, firmwide policies and procedures for downsizing systems; and establish a plan that sustains a common strategic IS focus while enabling a coherent distributed IS architecture. Such a program can result in a fully rationalized and successful strategy for downsizing, and for gaining maximum advantage from new workstation platforms and networked technologies. CIO

Theodore Klein is president of Boston Systems Group, a Boston-based consultancy specializing in client/server distributed and downsized information systems.

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HANDS ACROSS THE WATER

Whether by clever adaptation, persistent outreach or sweeping reform, systems developers and user departments work to bridge the gap between them

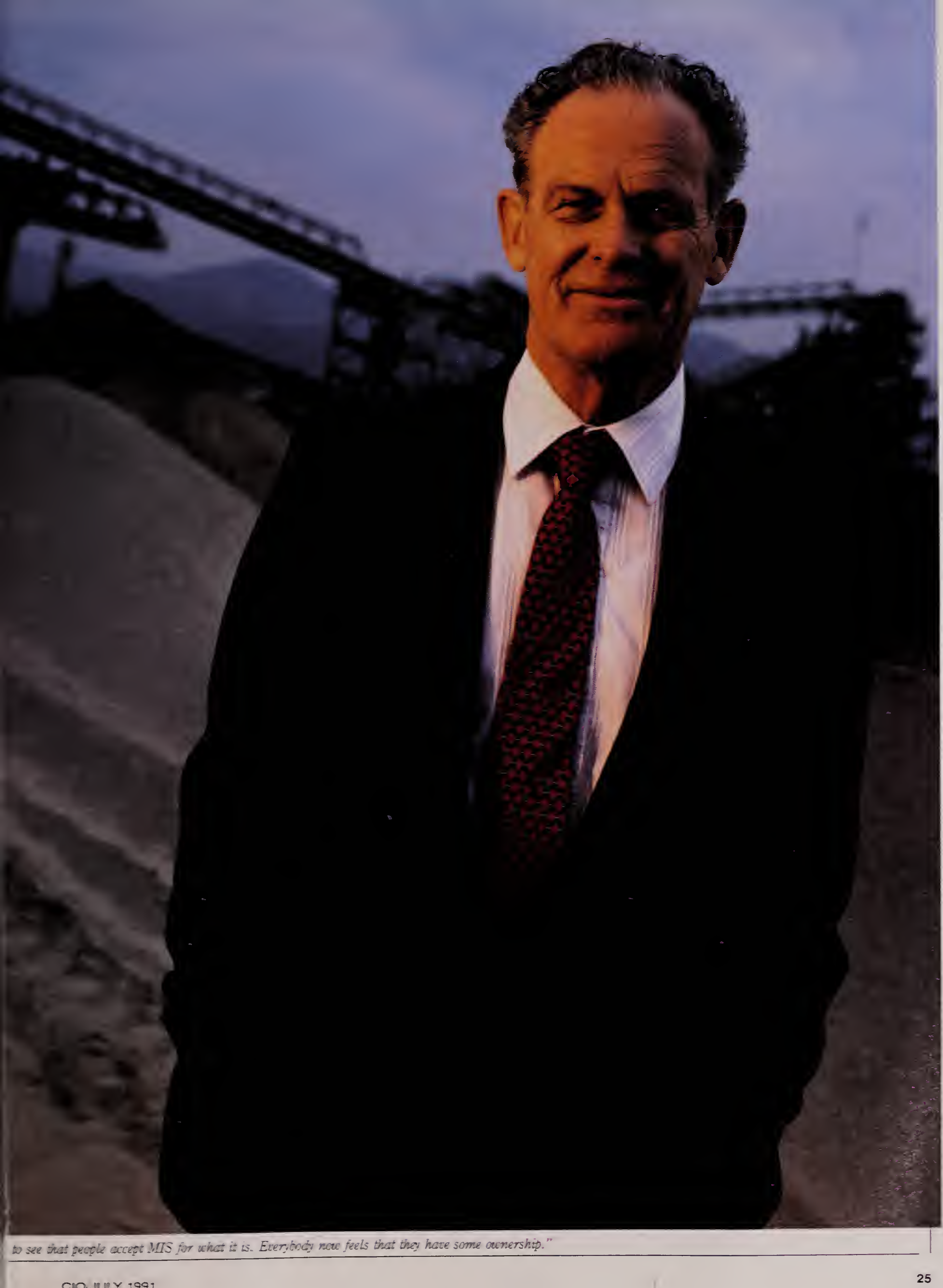
BY PAUL KONSTADT

No matter how compelling the benefits of IS-end user software development partnerships might be, there are organizations in which even rudimentary teamwork remains a distant goal. In some, users remain fearful of change or have been made suspicious by past IS failures. In others, analysts still live out the image of IS as a caste apart, constructing applications in isolation. Whatever the cause of the gulf between IS and users, it has proved to be bridgeable—albeit sometimes painfully—and IS people who have been through the process have found some effective coping strategies and shortcuts.

Urban public-school departments are some of the country's most tradition-bound organizations, which can make them an especially difficult breeding ground for IS-user software development partnerships. "We are very hierarchical, very channeled [and] very goal-oriented," said Tamara Drake, manager of payroll and financial management information systems for the Milwaukee public-school department. The school system's top administrators expect IS to work as a service bureau, having little contact with users until they request a solution, then again having little contact until the system is delivered. According to Drake, "They are telling IS: 'You should work with the users to meet their needs. . . . You be the experts and make it work for them.' [But] it's never the other way around. They don't expect the end users to work with IS." That message often seems to give users permission not to take ownership of their systems, Drake added, "but that is the direction that the organization has chosen, so we accept it."

PHOTO RIGHT BY LOIS GERVAIS

WOODY WOODWARD: *"We are beginning*



to see that people accept MIS for what it is. Everybody now feels that they have some ownership."

The school department's application for calculating early-retirement benefits is a good example of the weaknesses of the current system, Drake said. A job that she says should have taken the equivalent of a month's work or so to complete has already taken nine months, and there is no end in sight. One key reason for the added IS effort was that system developers could not get a complete set of the basic benefit rules, and the holes had to be filled by trial and error while the system was supposed to be in production. Another problem is that benefit calculations change as new labor contracts are negotiated and salary scales adjusted, but the users decline to perform any system maintenance themselves, so IS has to make the revisions. This is an attitude that Drake described as, "I give you information, magic happens, and you give me back a system I can use."

Drake has developed a number of strategies to adapt to her situation. One is to hire technologists with a strong vision. "If they come in with the drive and desire to improve our circumstances, they may suffer frustration and burnout, but they are an impetus for change," she said. Another strategy is to create only nonworking models of software under development. Mock-ups will often stimulate useful discussions with users about the ultimate form of the product, she found, while working prototypes seem to freeze the cycle because users "try to take them home and use them right away, [then] start asking for changes later down the line." A third coping strategy—aimed at neutralizing the fears of users who are afraid of technology—is to preserve existing interfaces even when the underlying applications have been completely reworked. "We minimize the amount of change the end user actually sees, [so] they are still dealing with something very familiar," she said. As an example, Drake cited the recent changeover from an old flat-file system to a relational database. "End users can peruse the database in the manner that they are accustomed to for the old homegrown system," she said.

> *"To make a promise and then fail on that promise. . . . It will breed resistance every time."*
>
> *–Tamara Drake*

TAMARA DRAKE: *"Administrators are telling IS, 'You be the experts and make it work for them.' "*

PHOTO BY JOHN NIENHUIS

Drake has also learned one sure way to create serious problems in user relations: "to make a promise and then fail on that promise. . . . It will breed resistance every time. [End users] will latch on to that promise like it's a life-saving device; they will demand that you produce what you promised. You can blame your failure on everything from hardware faults to losing staff, [but] nothing is going to get you out of that promise—[so] know what your limits are."

Mark Janda (pronounced YAHN-duh) knows that situation well. When he took the helm of the information systems unit at Toro Co.'s irrigation division two years ago, IS had almost completely worn out its welcome with operating executives. At the division's Riverside, Calif., base, they sometimes referred to it as "the IS department from hell," because the unit had a long-running record of ample budgets spent on sophisticated hardware that produced little overall positive effect. The existing corporate database exemplified the problem. All of the company's business records were stored under a single address—that is, stuffed into one massive unindexed electronic file. In order to find any particular record, the system needed to filter through everything in the file, which made search and retrieval unwieldy. Simply changing the software to create multiple addresses would have broken up the files and sped processing; instead, Janda's predecessors kept trying to buy faster disk drives and processors. As a result, breakdowns were frequent; system response time was slow, and user dissatisfaction was high.

In order to gain credibility with users, Janda felt he had to first prove to them that IS could perform its basic accounting and record-keeping chores adequately. "I had to put the wheels back on," he said. He told users that he would undertake no significant new initiatives until "we got the environment straightened out." After years of failed promises, users apparently found that commitment to basics refreshing, and doors that had long been closed to IS are now open.

The new dialogue about basic applications could not by itself create a strategic IS-user partnership at the Toro unit, because of the legacy of ignorance left by the years of IS-user estrangement. "The user community . . . really had very little knowledge of what information systems could do," Janda said. "Basically they looked on information systems as a way to automate clerical support functions." Janda wants his colleagues to see that the real purpose of IS is not to take low-level clerical functions and develop systems that automate them, but to improve larger business processes. "That's the gut issue that needs to get on the table, [and] it took a massive educational process to just get the conversation on the right plane," he said.

MARK JANDA: *The purpose of IS is to improve larger business processes.*

PHOTO BY LOIS GERVAIS

Janda has just begun the second phase of his turnaround plan, so the IS department is beginning to look at ways it can add functionality to the company's systems. Only after there is a solid record of advanced applications that were developed in conjunction with users will Janda feel that a true partnership has been established in the business unit. "Call me in a year," he suggested.

Where IS developers and their end users have no history of ever trying to work together, inertia itself can pose a significant barrier. Such appears to be the case at the Nebraska Public Power District. Brandt Karstens, information center supervisor in the district, has to overcome such indifference regularly, and he found that simply cultivating personal relationships was the clearest route to effective partnership. "It may take a year, [but] persistence has usually brought us to a common understanding," he said. "Generally people want to work together, [so] the real key is being a diplomat—taking the time to understand where the clients are coming from."

The public power district was built by merger and acquisition more than by internal growth, so its corporate culture is an agglomeration of sophisticated engineering users, government and utility managers, and veterans of small rural cooperatives. In Karstens' words, it is an organization in which "everyone doesn't march to the same sheet of music." Karstens views winning over the reluctant members of the power district team as a substantial part of his job, and he has found that cultivating direct personal relationships is the only way to assure success. "That's why it's so important to sit down and talk to people, to be interested in what they're doing," he said. This general getting-acquainted process allows Karstens to address specific concerns about his role as emissary of headquarters, particularly to allay what seem to be fairly pervasive fears about unwanted interference. "[It] helps [end users] understand that we want to help them achieve their goals rather than thwart them," he said. "It shows that we're genuinely interested in what they are doing as a business or function."

This kind of aggressive customer-outreach is a relatively new addition to the IS operating repertoire at the power district. It is part of a broader move to encourage all units of the organization to pay more attention to customer satisfaction, both for internal and external customers. Karstens' bridge-building efforts have the support of senior management, something he believes to be a key component of his partnership successes. "We are talking more about participative management, [and that] general philosophy definitely has support," he said.

While many IS-user development partnerships are born from the initiatives of progressive information executives, others are often stymied by IS's reluctance, or even resistance. James C. Wetherbe, director of the MIS Research Center at the University of Minnesota in Minneapolis, believes that many IS organizations are more concerned with setting an overall IT agenda than with providing customer-directed service. In these organizations, users have begun independently creating their own information systems, and this thriving

The Other Side of the Gap

How one baffled, frustrated user rates IS performance

Some corporate computer users agree that good software development takes teamwork, and they stand ready to do their part. They just feel that their corporate information systems units seem not to be partners in progress, but dragging anchors. "Our IS department's responsiveness is very slow," said Ted Kyster, the former controller and division manager of finance and accounting for the Nebraska Public Power District who has recently retired. Some application development efforts Kyster knew of ran their courses without major incident, but took a year or more to complete. "It should be shorter, it would seem to me," he said.

The public power district's operations are strewn across more than 77,300 square miles of the Great Plains, distributing power over about 80 percent of Nebraska's land area and running three coal-fired electric generating stations, one commercial nuclear reactor and a handful of hydroelectric dams. From Kyster's vantage point at headquarters in the small city of Columbus, an hour and a half west of Omaha, it seems that many factors contributed to the difficulty. None of the major stumbling blocks were put there with the intent of impeding partnership development, Kyster said. But impede it, they did.

Kyster has identified two problems that grow out of the operating styles of the user and IS communities. One is endemic to central IS organizations everywhere: technologists' habit of mulling over a conundrum until they find its optimal solution. "They spend too much time analyzing and studying, as opposed to trying to accomplish things," he said. On the other hand, he acknowledged, line managers' fast-paced operating style provides its own barriers to partnership. In the lean-and-mean business world, managers sometimes delegate IS planning tasks to subordinates who themselves may be stretched too thin to give the critical mass of time needed to develop a relationship. "We are often . . . short-handed, and that makes it more difficult to get a job accomplished," Kyster said.

Complicating the partnership-forming process further is the virtual explosion in the use of information technology in the district: The IS organization's ability to supply solutions has not kept pace with that demand. Kyster said that "because new things . . . don't get done," impatient line managers are bypassing IS altogether and buying off-the-shelf software for their growing networks of personal computers. "With the PCs, we have a little more flexibility," he said.

—P. Konstadt

At **NEBRASKA PUBLIC POWER:** *a clash of styles.*

PHOTO BY PATRICK DRICKEY

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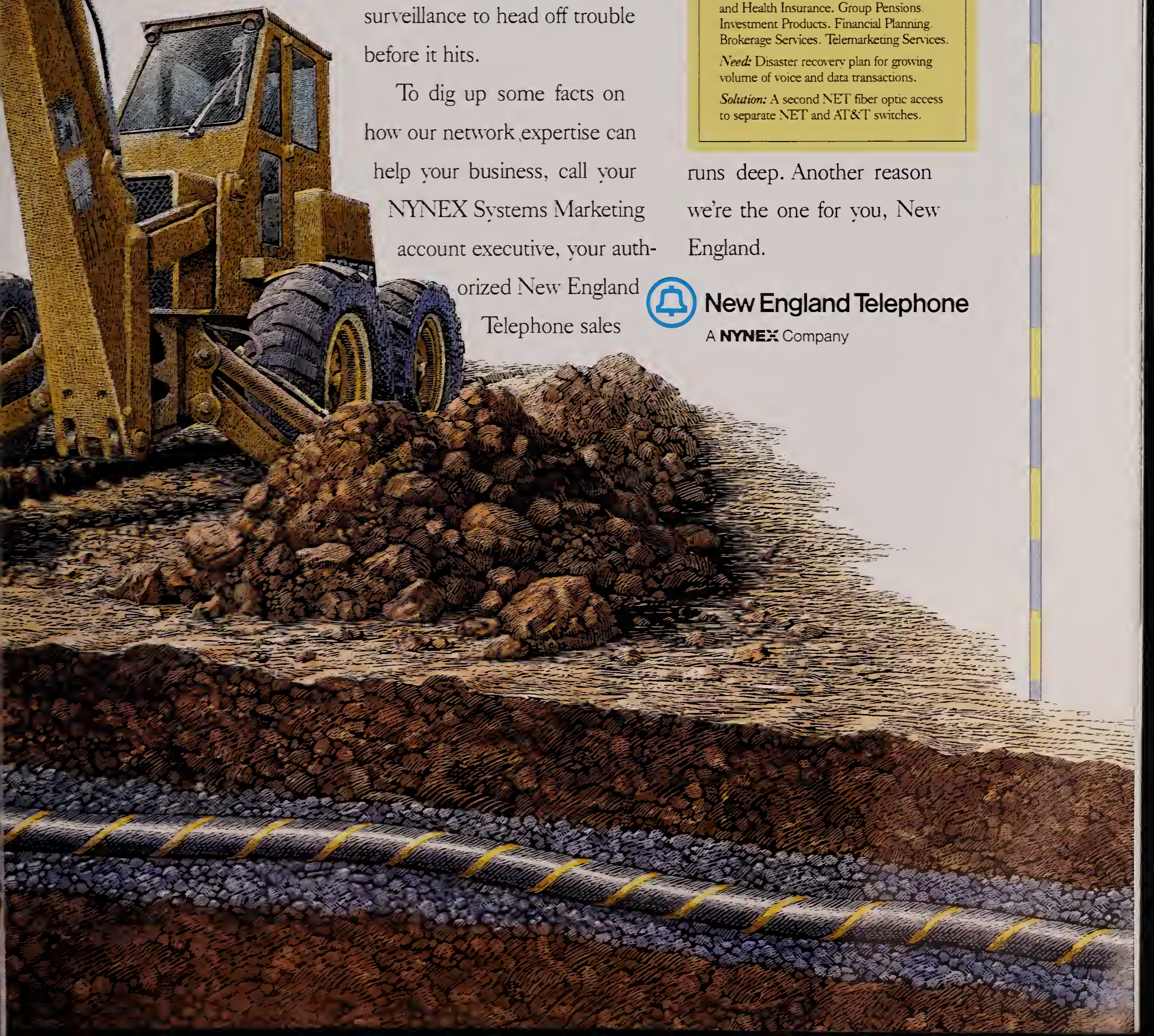

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Call New England Telephone or one of our authorized sales agents • Executone Information Systems (Boston) 1 800 852-3122 Network Research and Control, Inc. 1 800 445-4541 • AIM Telephones of New England, Inc. 1 800 CALL AIM • US TeleCenters (617) 439-9911, 1 800 441-3211 • Computer Telephone Corporation (617) 466-8080, 1 800 225-3288 • Telenetwork Services, Inc. (401) 434-9000, 1 800 525-0032 • COMLINK Network Services 1 800 428-2212 • Community Telecommunications Corp. within ME 1 800 522-3993 • Network Services Corp. 1 800 442-5221 • Eastern Telecom, Inc. 1 800 535-1068 technological underground has spawned a climate of suspicion.

"First IS told them they couldn't get to [their applications] for years; then they tried to stop them from doing it themselves, and now they claim they're out trying to help," Wetherbe recounted. "The problem is just history; it's a credibility issue." Wetherbe's solution may sound easier than it is. "You've got to network around," he said. "Find out who the influencers of perception are, who the users really listen to, then establish relationships with them."

> *"Generally people want to work together, so the real key is being a diplomat—taking the time to understand where the clients are coming from."*
>
> *–Brandt Karstens*

Pressure from the top seems to be an almost universal element of stories about successful partnership building. At Toro and the Nebraska Public Power District, that pressure came in the form of upper-echelon support for IS managers' joint development initiatives. But sometimes it is the users who want more influence over software development, and IS managers who resist their input. That was the case at the CalMat Co. in Los Angeles. Line executives there demanded a greater role in IS planning, and the ensuing pressure from the top hit veteran CalMat IS managers like one of the building-products firm's bags of concrete. "Management was reading the papers; they felt that decentralization was the way to go," said Woody Woodward, CalMat's director of computing and technical services. According to Woodward, CalMat's upper management prefers to have end users included in the technology planning and development process.

The mechanism that CalMat executives chose to create their IS-user partnership was a study committee—working groups with both IS and line management members who together oversee internal application development and the purchase of ready-made packages for individual business areas. From the outset of the study committee system, it was the information technology organization, not the users, that appeared to be more troubled by the arrangement. "It started out looking like an invasion of MIS," Woodward said, "but we are beginning to see that people accept MIS for what it is, and that acceptance is a little gratifying. . . . Everybody now feels that they have some ownership, that they have a vested interest." It was the technical members of the IS team that were most afraid of the deal, Woodward said. "What we've had to do is bring the technical people into the final process, have them do some validations. They get their two cents in, [and the company's] technical values are not trashed."

BRANDT KARSTENS *cultivates relationships with end users in order to allay pervasive fears.*

PHOTO BY PATRICK DRICKEY

Sometimes, though, the study teams do make life uncomfortable for Woodward. In one recent case, a team vetoed the IS department's choice for a particular software package, an action that led to some protracted bargaining between IS and the business unit. "We eventually went to an alternative vendor and found the common ground we were looking for," Woodward said.

For all his initial hesitation and the tribulations of adjustment, Woodward said that after more than a year spent trying to establish a partnership, CalMat and its IS department are better off. "We have better communication now, and a structure that allows MIS to be much more useful," he said. "After you build up a rapport, everything flows very smoothly." CIO

HOME SWEET OFFICE

At a time when highways are clogged, office space is at a premium and valuable workers can be hard to hang on to, telecommuting offers benefits to employers and employees alike

BY MEGHAN O'LEARY

Telecommuting, like Pittsburgh, is often unfairly dismissed by people who have never tried it.

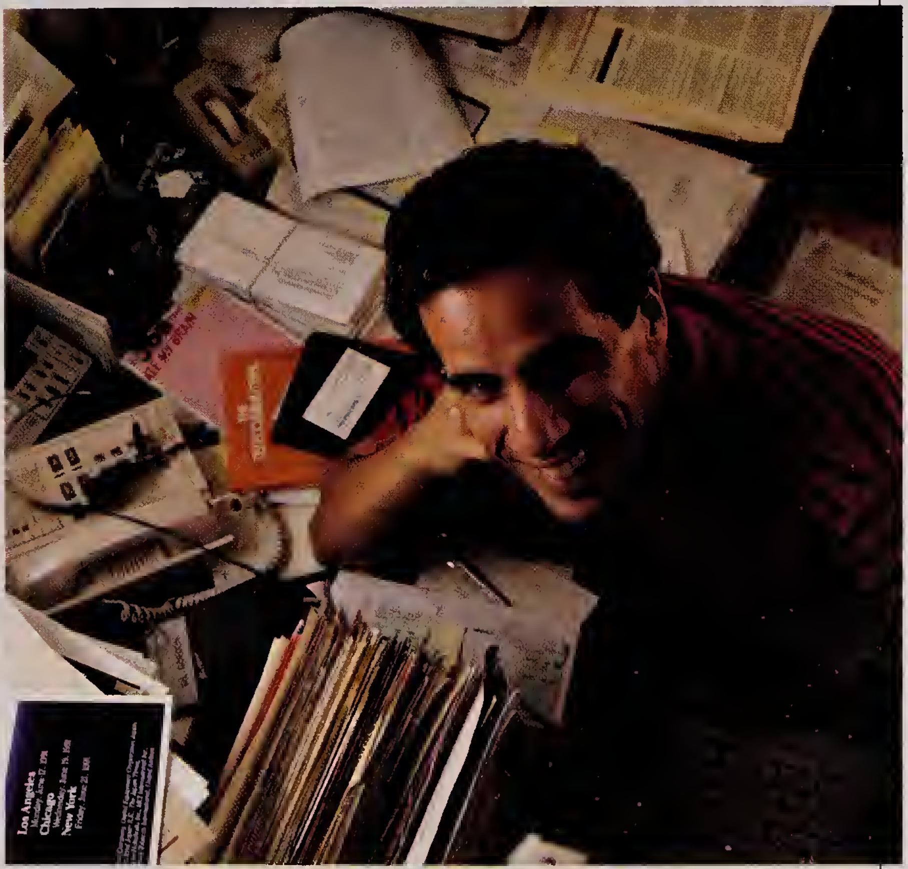
Just as the Iron City is plagued by its outdated reputation as a pollution-choked steel town, telecommuting is often still thought of as a frivolous work option for part-timers and people who aren't serious about their jobs. "One of the stereotypes that prevails is that telecommuting is just a perk for employees," explained Gil E. Gordon of Gil Gordon Associates, a flexible-work options consultant in Monmouth Junction, N.J. "The manager envisions employees sitting home in blue jeans and maybe sneaking off to watch a soap opera and asks the legitimate question, 'Why should we do this?' "

Today, however, the arguments for flexible work hours and locations are becoming more compelling. Proponents of telecommuting can offer concrete evidence of productivity gains (20 percent on average), cost savings, improved morale and more effective workgroup communication.

Add to this the fact that companies are trying to cut travel costs, to recruit and retain employees, to tap remote labor pools and to reduce the need for costly office space. The most progressive companies are grappling with ways to meet the needs of employees—especially those with families—for greater work flexibility and fewer hours in traffic. In some cases, city governments have urged companies to support flexible work options in an effort to ease congestion and pollution and to curb spending on public roadways.

"It needs a little bit of a catalyst," suggested J. Ron

PHOTOS LEFT AND RIGHT BY PETER VIDOR



PAULA NORWOOD *(left) and* **GIL GORDON:** *Telecommuting is no mere perk: It can address problems of space, flexibility and productivity.*

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> **"The office, in most cases, is a lousy place to work. One thing workers tell us is that by getting away from the office they get away from the distractions that keep them from working well."**
>
> *–Gil E. Gordon*

Cross, director of regulatory policy analysis for Northern Telecom Inc. in Nashville, Tenn. "With [the recent jump] in oil prices, a lot of firms got into [off-site work options] as a replacement for travel. Lo and behold, they realized there were significant reductions in expenses and improvements in productivity."

The majority of telecommuters work at home or in satellite offices only two to three days a week. Companies recognize the importance of face-to-face contact to promote workgroup cohesiveness. And many telecommuting employees don't want to be isolated from the corporate culture.

According to Thomas E. Miller, director of the Home Office Research Program at the technology research and consulting firm LINK Resources Corp. in New York, that preference for office contact "reflects the reality that when it comes to careers and personal work identity, not everyone is cut out to be an independent entrepreneur. So the original vision of telecommuting as a fundamental, full-time substitute for the workplace has not, so far, materialized, and it looks like it won't."

"Industry isn't moving to telecommuting as an [alternative] to working in the office, but as [enhancing] the ability to get your work done," agreed Paul L. Derby, director of MIS for Control Data Corp.'s Computer Products Group in Minneapolis, which has informal telecommuting arrangements for about 2,000 of its programmers and marketing professionals. "If you can still take care of your daily business, . . . regardless of where you are, then the office becomes less sanctified."

Telecommuting is suited to any part of any job that doesn't require frequent face-to-face interaction. Anyone who can work independently (telemarketers) or who requires stretches of uninterrupted, heads-down thinking (programmers, marketing professionals, administrative professionals, top-level executives) can telecommute effectively.

As for the needs of white-collar professionals, "the office, in most cases, is a lousy place to work," said Gordon. "One thing most workers tell us is that by getting away from the [office] they get away from the distractions that keep them from working well."

The most common catalyst for establishing corporate telecommuting programs seems to be the need to recruit and retain valued employees. The IS department at Sears Roebuck & Co. of Chicago started a telecommuting pilot last September when it began planning a move to a suburb 25 miles away, according to Audrey R. Walker, human-resources manager for the department. "With the information systems industry being as dynamic as it is, we might lose some people who don't want to relocate to the suburbs," she said. "So we started looking at alternate workstyles."

Likewise, The Travelers Insurance Co. of Hartford, Conn., implemented telecommuting for about 50 of its programmers to meet demands for increased programmer productivity. "Retention is always a problem, particularly in Hartford because we have a lot of insurance companies headquartered here," said Doug Willette, division head for human resources. Historically, the competition has resulted in high turnover and reduced productivity from less-experienced new hires. Since insurance companies generally use identical programming tools, such benefits as a pleasant work environment or flexible work arrangements have been the only way to differentiate one programming job from another.

Telecommuting's flexibility can

DAVID FLEMING *designed a telecommuting program to reduce pollution and overcrowding—and ended up saving money as well.*

PHOTO BY DAVID POWERS

help companies through possibly disruptive transitions, according to Dr. Paula K. Norwood, vice president of medical biostatistics and data operations worldwide at RW Johnson Pharmaceutical Research Institute in Raritan, N.J. Norwood set up a formal telecommuting program at sister company Ortho Pharmaceuticals six years ago when the company was searching for more office space and needed to keep current employees comfortable and productive while doubling them up in offices.

Some telecommuting initiatives come from government. The state of California completed a phenomenally successful two-year pilot in early 1990 in which about 200 state workers telecommuted from their homes or from suburban state offices to Sacramento. The pilot was designed to address traffic congestion, overcrowding and air pollution in the metropolitan area. According to David K. Fleming, director of the program, California's pilot achieved productivity and savings gains of three times the project's cost. The state recently passed a bill requiring private companies to create telework centers (fully-equipped satellite offices from which employees can telecommute) in Southern California.

Similarly, Pacific Bell in Los Angeles began its telecommuting program in 1984 as part of a temporary, citywide effort to accommodate tourist traffic from the Summer Olympics, according to Carol Nolan, telecommuting manager. "The main site for the Olympics was right in downtown L.A.," she said. "So the L.A. Olympic organizing committee said to the business community, 'You've got to change the way you do business during the two weeks of the Olympics or nobody is going to be able to get to the events.' "

Businesses responded by scheduling midnight deliveries and putting employees on after-hours shifts. Pac Bell had to find a way to get its employees out of the downtown area without disrupting its 24-hour operations. The company shifted people into suburban offices and set up others with computers at home. "I'm sure there were ambivalent feelings about doing this," Nolan said, "but they figured it's only going to be for two weeks. How bad can you screw up the business in two weeks?"

In fact, Pac Bell's telecommuting program was so successful at improving productivity and morale that, following the Olympics, the company assigned a project team to look into telecommuting as a permanent work option. In May 1985 the company rolled out its formal telecommuting pilot with 70 home-based workers

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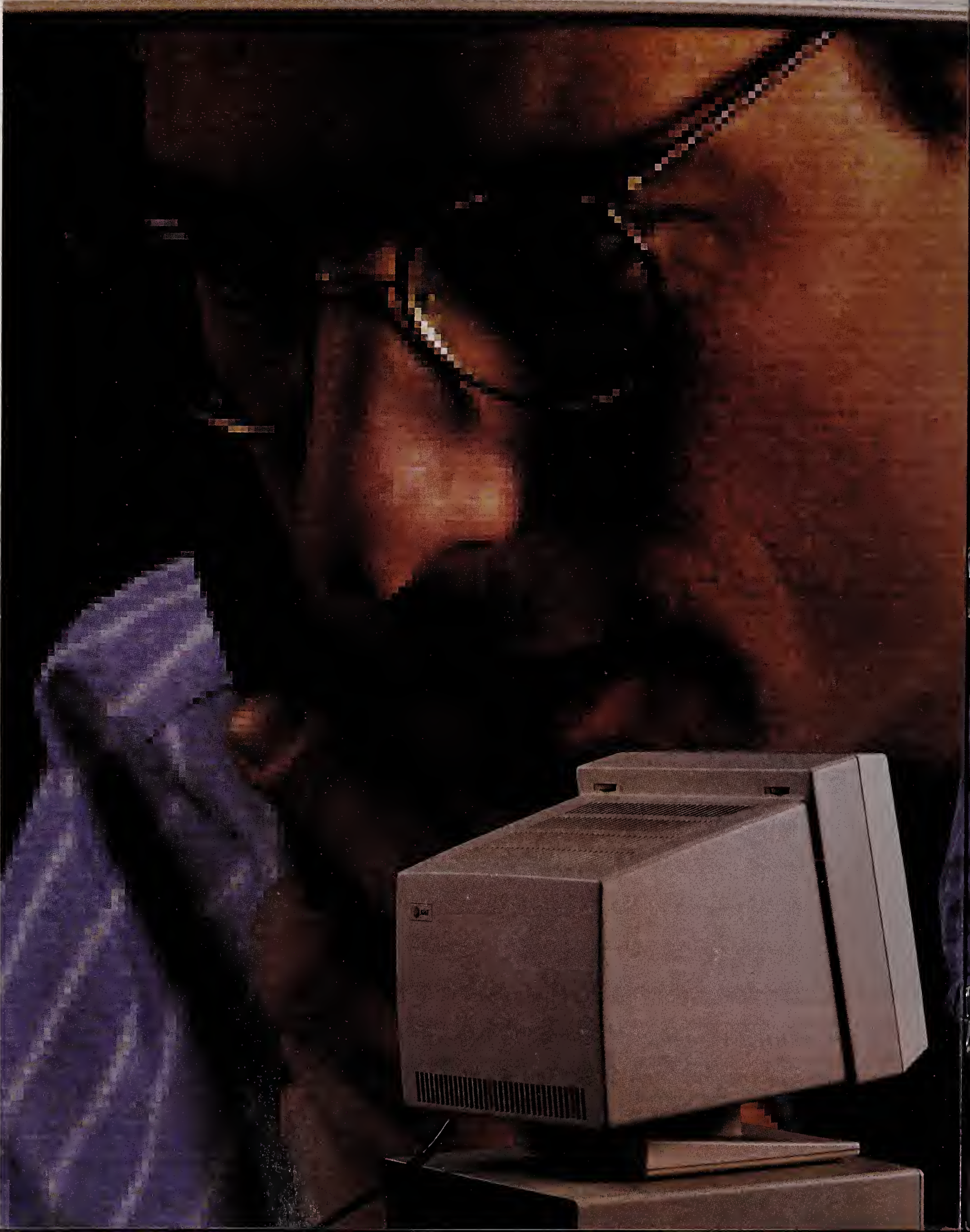

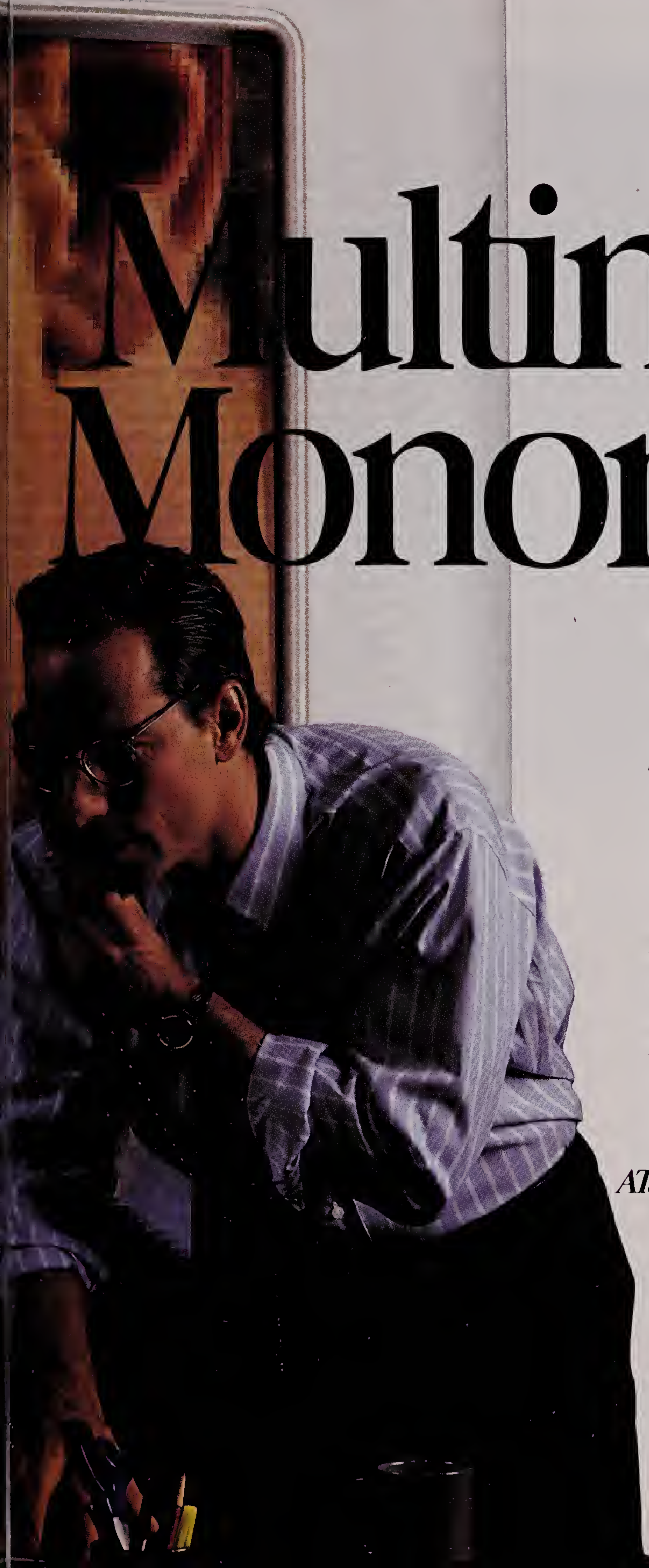

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Or, Why We're Absolutely Positively Obsessed With Helping Computers Listen, See, and Talk.

One thing is clear about the future of technology. There will be a merger of voice, data, and image communications. We'll "talk" to our computers rather than "key" them. "Listen," rather than "read" them. High speed compression and decompression, digital signal processing, word spotting, ISDN, and other technologies will make this multimedia world possible. And what these unique technologies have in common is that AT&T Network Systems and Bell Laboratories are in the forefront of all of them. AT&T is obsessed with researching. Developing. Integrating. Implementing. So when multimedia is finally "here," you'll find it at AT&T and your local phone company first.

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and 30 more at two suburban satellite offices. At the time, the company was going through a centralization process and found it could avoid some costly relocations or resignations by allowing employees to telecommute. The company also saw improved productivity—projects delivered ahead of schedule—and morale.

Other states are testing similar approaches to the same problems. Last March the Washington State Energy Office (WSEO), in Olympia, opened two pilot telework centers outside Seattle for 21 public and private organizations in order to address that city's traffic congestion problem. The state's employee telework center has 15 networked workstations accommodating about 250 telecommuters for two days a week each. Michael Farley, project manager, estimates that working at the center eliminates about 100 miles and two hours of commuting per employee each day.

Today's communications technology is easily equal to the demands of telecommuting. At bare minimum, people can telecommute by phone. Leased lines, while expensive, can easily connect home computers to office networks. Public phone lines are adequate for most individual data transmission. For most companies, the real dilemma is how much technology and how to pay for it.

"The setup really depends on what people are doing," said Nolan. Some of her telecommuters work with their residence telephones, 2400 baud modems and PCs. They call in to check voice mail several times a day. Nolan has set up other telecommuters—some client software engineers in Silicon Valley—with CAD/CAM workstations and T-1 multiplexing (high-capacity digital transport).

Whatever an employee's needs, program managers agree that a permanent, comprehensive telecommuting program requires easy access to corporate networks as well as the support of such technologies as E-mail and voice mail.

"There are definitely workflow issues that arise with telecommuting," said LINK's Miller. "There's a world of difference between telecommuting with voice mail and E-mail and without it. If not everyone is using E-mail, the telecommuter is limited."

Choosing the right employees to telecommute is at least as important as choosing the proper technologies to support them (see related story, Page 40). Sears employees are required to fill out an application in which they list their expectations, concerns and hard business reasons for wanting to telecommute.

"There were lots of people who volunteered," said Pac Bell's Nolan. "We only chose people on the basis of what telecommuting would do for the corporation." In one case, telecommuting kept a valued employee on staff by giving her the job flexibility she needed to join an inflexibly scheduled Ph.D. program. "She said she'd be a better employee because she'd be more highly educated," Nolan said. "Her boss valued her and said it would cost $100,000 to recruit somebody to replace her. In instances like that, it was pretty easy to cost justify it."

RW Johnson's Norwood accepted about 14 of the 20 applicants for Ortho's telecommuting pilot. "We sat down as managers to decide which jobs were suitable for telecommuting," she said. "We also defined what kinds of personal characteristics would be most important for telecommuters. If we thought that people weren't going to work independently, we wouldn't let them do it. We asked people to think very carefully about what they got out of work."

One Ortho employee who eventu-

Feeling Right at Home

Working outside the office forces an extra degree of planning; but it also affords the opportunity to attend to some household chores

Cindy Hardiman sometimes shows up for work in a sweatshirt and slippers. Far from hindering her progress among her more traditionally attired peers, however, this unorthodox business uniform is part of her professional advancement; in it, she telecommutes to work two days a week while finishing her bachelor's degree at a local college. A senior scientific programmer at RW Johnson Pharmaceutical Research Institute in Raritan, N.J., Hardiman began telecommuting four years ago when PRI (then Ortho Pharmaceutical) was searching for more office space, and has telecommuted on and off since then.

Being out of the office part of the time has forced Hardiman to be more organized, to think ahead about what information, materials and peer input she'll need. Telecommuting has also improved communication in her department; she and her coworkers need constant, clear contact in order to monitor project progress, and to arrange meetings on days when telecommuters (15 in all) will be in. She believes that the quiet of her home increases her productivity. Amid the noise at her cubicled office, "sometimes you can't concentrate on what you're doing unless you stick your fingers in your ears," she said.

Although at first she was concerned about the professional consequences of being out of the work mainstream two days a week, Hardiman has come to see her telecommuting arrangement as proof that PRI values her work and her professional development. And while she forgoes the camaraderie of office coffee breaks on her days at home, she realizes an unexpected benefit from that time: She gets her laundry done. *—M. O'Leary* ally returned to the office permanently said that he couldn't work well at home because he kept inventing reasons to talk to people. "That was part of the training," Norwood said, "to make people aware of the problems they might have." Ortho told its telecommuters that it was their responsibility to speak up about problems they were having with motivation and productivity.

Laying out parameters for employee responsibility and successful telecommuting is part of the critical planning process. California's Fleming attributes the success of that state's telecommuting pilot largely to careful planning and management. Fleming prepared for the pilot by creating a written plan, putting orientation and training programs in place for managers and telecommuters alike, getting the endorsement of top management, implementing careful selection guidelines and continuously monitoring and evaluating progress.

> **"If you shift the focus from management by seeing to management by results, then it becomes easy to administer a telecommuting program."**
>
> *–Carol Nolan*

The Travelers looked at telecommuting as a possible competitive tool from the outset, according to Michael Crampton, a director in the telecommunications division. The company put together a comprehensive program that included training, an addendum to the employee handbook, a management guide, a facilities guide, support guidelines and an evaluation model. That careful documentation and planning resulted in a workbook to help departments evaluate and implement telecommuting.

CAROL NOLAN: *"We chose people on the basis of what telecommuting would do for the company."*

PHOTO BY STEVEN BURR WILLIAMS

Key to the success of any telecommuting plan is a measure by which to judge its effectiveness. Managers who worry about employee productivity often object to telecommuting because they can't be sure employees will be working.

"There are very few organizations that do what we call managing by objective," said Pac Bell's Nolan. "Just because employees are sitting at their desks doesn't mean they're doing work. If you shift the focus from management by seeing to management by results, then it becomes very easy to administer and manage a telecommuting program."

This shift toward management by objective is reflected in the profile of telecommuters today, according to LINK's Miller. "Today's telecommuters are much more likely to be autonomous business professionals and executives with whom monitoring is done by results. You don't monitor a white-collar worker. They either make their objectives or lose their jobs. Clerical jobs and data-entry jobs where monitoring is more of an issue and could become more oppressive have fallen away from telecommuting," he said.

One of the California pilot's findings, according to Fleming, was that many managers didn't have performance standards to begin with. Telecommuting highlighted the issue when it met with some strong resistance from middle managers who feared losing control of their employees.

Under a well-planned telecommuting program, such fears are unfounded, said Nolan. "If you're doing management by objective, you're going to have the telecommuters sit down and describe what it is they're going to accomplish." If they fail, they get pulled off the program.

"Telecommuting reveals the inherent weaknesses in an organization," said WSEO's Farley. "If you're a poor worker, if your managers are poor managers, if you're incompetent—it will reveal that."

Fit To Be Tried

Many are called, but fewer are really suited to call in

Regardless of how many procedures a company puts in place to support telecommuting, the success of any program comes down to its participants. By means of observation and the occasional formal checklist, companies are stressing the importance of measuring telecommuters' mettle before making a commitment.

"We're very careful about who we select as telecommuters," said Gil E. Gordon, a consultant in Monmouth Junction, N.J., who helps companies choose their telecommuters. "We're looking for people who have exhibited certain characteristics that make us think we can trust them."

"If you're a good worker in the office, you'll be a good worker at home," said Michael Farley, project manager of the Puget Sound Telecommuting Demonstration for the Washington State Energy Office. "You don't change just because there's an authority figure standing over your desk."

Some organizations try to look at the personal side of telecommuting. For example, while setting up her first telecommuting pilot, Paula Norwood, vice president of medical biostatistics and data operations for RW Johnson Pharmaceutical Research Institute in Raritan, N.J., sat down with managers to draw up a list of the personal characteristics required to be a successful telecommuter. "We had a list of about 15 things that people should consider," she said. For instance, people whom supervisors thought didn't work well independently were not accepted for the pilot. The project team also asked applicants to think about whether they tended to get lonely, and about what they got out of going to the office.

Occasionally, extensive testing may not be the final determinant in the telecommuting decision, according to Paul Derby, director of MIS for Control Data Corp.'s Computer Products Group in Minneapolis. Some employees—regardless of their potential—may simply prefer the office environment, he said. *—M. O'Leary*

Telecommuting can also have a positive effect on workgroup cohesiveness, according to Fleming, because it forces workers and managers to communicate more efficiently.

"Managers will say two things about telecommuting," said Gordon. "First, that it has helped them reevaluate the need for all those meetings; second, that it has made them better managers of the people in the office. They have to be more specific about delivery and goals with telecommuters. [Until now] they've had the luxury of hallway management."

"I would say that our communication has been strengthened," agreed The Travelers' Willette. In a telecommuting environment where team members are not physically present, "the need to understand clearly is a much higher priority."

In light of such management and environmental benefits, companies have high hopes for their telecommuting programs and are carefully weighing their real value. But cost justification and positive pilot results are important issues. At Sears, for example, the cost of investing in new equipment for employees' homes has temporarily put the program on hold.

In the state of Washington the families of pilot participants are keeping travel diaries that will show whether telecommuting reduces the number of car trips or just frees up the car for other trips. By weighing external factors such as fuel prices the state can assess the true impact of telecommuting on travel patterns and fuel consumption.

Supervisors and coworkers of telecommuters are filling out surveys to assess the psychosocial impact of telecommuting. Farley's group will also be conducting interviews and focus groups and doing ethnographic research on the culture that emerges at the state's telework center.

"Judging from our success," said California's Fleming, telecommuting is moving forward. "But it isn't like the Hula Hoop that suddenly hits the market and takes off."

> **"Managers will say two things about telecommuting: first, that it has helped them reevaluate the need for all those meetings; second, that it has made them better managers of the people in the office."**
>
> *–Gil E. Gordon*

Most companies aren't progressive enough to implement telecommuting on a large scale, added Gordon. For many companies, flex time is still unheard of, even when employees work only from the office. "It's different from the model we've all grown up with of direct supervision," he said. "But you could say the same about anything else. Most IS shops aren't using CASE tools, either. Innovation is something that a few people start with and others follow."

"We've found that telecommuting is not *the* answer to anything, but *an* answer," said Willette. "It's an important component to this company's program to address diversity needs. I see it as something that will grow, but I don't see an officeless office. I see a lot of sociological benefits to the office environment."

As employees become more aware of telecommuting, they may begin demanding such work options. CIO

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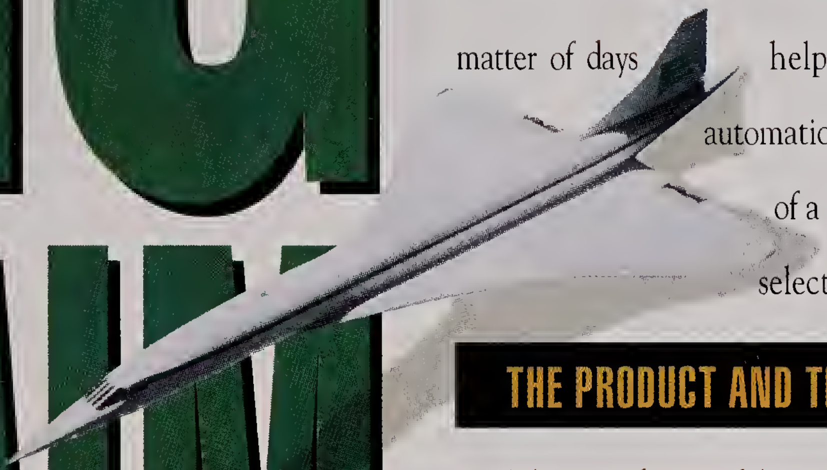

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BY DAVID FREEDMAN

THE MYTH OF STRATEGIC I.S.

The aura of magic that has long surrounded such legendary IT systems as Sabre and ASAP may owe less to the systems themselves than to their organizations' underlying business strength

In 1984, a *Harvard Business Review* article by Harvard Business School Professor F. Warren McFarlan served as the semiofficial starting gun for one of the most frantic and expensive races in the history of business. The article, entitled "Information Technology Changes the Way You Compete," helped solidify the vague notion that information technology could play a lead role in determining the success or failure of an organization. From then on, systems such as American Airlines' Sabre, American Hospital Supply's ASAP and Otis Elevator's Otisline would be held up again and again as irrefutable examples of the potential for IT to become a devastating competitive weapon; they were harbingers of the things to come.

Or were they? Last year, another *Harvard Business Review* article counseled it was time to call a halt to the race for competitive-edge information systems. The author should know: He is American Airlines' Vice President of Information Systems Max Hopper, the driving force behind Sabre. Hopper claimed that contrary to conventional wisdom, Sabre never really did much for American Airlines' market share, and that whatever opportunities did exist to obtain competitive advantage from a proprietary information system like Sabre have since vanished. "While it is more dangerous than ever to ignore the power of information technology," Hopper wrote, "it is more dangerous still to believe that on its own, an information system can provide an enduring business advantage."

While many have criticized Hopper's assertions as disingenuous—in a letter to the *Review* McFarlan called him "a man-eating tiger in sheep's clothing"—Hopper makes a case that

ILLUSTRATION BY WARREN GEBERT

Gebert

can't be ignored. In fact, there is a growing consensus among IT observers that the cherished notion of being able to obtain significant strategic advantage directly through an information system is an obsolete one—if it was ever valid to begin with.

"The use of technology as a standalone initiative to deliver competitive advantage has probably run its course," said Harvard Business School Professor James Cash. Cash insists that IT continues to be a strategic resource, but that its use has to be coupled with a redesign of organizational structures and management control systems. "In doing that," he said, "a company provides itself with the opportunity to gain competitive advantages over the course of the next decade. But you're not going to see systems within a single function that will blow everybody else out of the water. That might have been possible 10 years ago, but not today."

Robert Morison, a vice president at the Index Group management consulting firm in Cambridge, Mass., feels the same way. "Competitive advantage comes more from business processes than it does from systems," he said. "A lot of the famous, supposedly competitive-edge systems in fact represented a long-term investment in business process capability. What appeared as a strategic system was actually just a front end."

If you want to argue the point, don't look for support to the CIOs who pioneered the classic strategic systems. Like Hopper, some of these executives paint very different pictures of the origins and significance of their celebrated systems than the mythology that has been bandied about for the past 10 years or so. In general, they make two key points. First, they claim the systems in question were merely one facet of a complex set of capabilities that had been developed over a long period of time in response to unusual business conditions. Second, they say the systems did not have the market-share-boosting effect that has been ascribed to them. Instead, their benefits came over a period of years as the organizations learned to reshape the way they did business based on the higher quality and quantity of information these and other systems provided.

Take Sabre. The standard story depicts American Airlines as selling more fares by giving itself better po-

> *"You're not going to see systems within a single function that will blow everybody else out of the water. That might have been possible 10 years ago, but not today."*
>
> *–James Cash*

Advice to the Competitively Obsessed

Six steps to achieving an authentic advantage

Can your company come up with a system that will provide a sustainable competitive edge? Probably not, most experts say. But if you want to try anyway, take the following advice from the Index Group and Hammer and Co., both of Cambridge, Mass. Their recommendations are based on a joint study of 70 organizations.

Make a dramatic change. "No pain, no gain," according to Index and Hammer. If your system isn't shaking things up in a big way, then you can't expect to reap huge benefits—or count on your competitors not to follow your move in short order.

Ensure sustainability. Build in barriers to imitation, or you'll just end up in an IT arms race; your customers will probably benefit, but at the expense of your industry's profit margins. One costly way to fend off imitators is to enlist complex, high-risk technologies like global networks and expert systems in which others may hesitate to invest.

Build on a solid platform. The most successful strategic systems came from humble origins, such as inventory and order-entry systems. Strategic systems should build on these platforms and should themselves lay the foundation for future strategic systems.

Assess your industry's structure. If you are a large company in an industry that consists mostly of small companies, it is unlikely that many of your competitors will be able to match your IT accomplishments. Otherwise, your plans could backfire.

Consider customer concerns. Attempts to lock in customers against their will are likely to fail in the long run. Winning schemes involve ways of meeting customers' needs, not short-circuiting their options.

Don't underestimate risk. There is no shortage of uncertainties that could cause your plans to go awry. A competitor could respond with an even more extensive system; the government could step in with regulation or deregulation of your industry; new technologies could radically alter the playing field. Failure to recognize these risks and protect against them could cause your investment in strategic IT to go south almost overnight.

–D. Freedman

sitions on the screens of the airline reservation terminals it placed in travel agents' offices. In the *Review* article, Hopper dismissed such assertions by noting that American's business was unaffected when the government forbade such favoritism on the system in 1984. Nor was Sabre ever intended for such purposes, he said. Sabre was built as a means of helping American keep track of its own fares, reservations and scheduling. Ultimately, he claimed, Sabre's contribution to the company has been that it allowed American to become uniquely adept at making scheduling, fare and other decisions based on the market and industry information the system provides—information that is available to most other airlines, in some cases because American itself sells them the needed software. "We don't worry much if the competition also has access to the technology," he explained. "We think we can be smarter in how we use it."

And then, of course, there is American Hospital Supply's ASAP, the customer-based order-entry system that is supposed to have almost single-handedly enabled AHS to dominate its industry. AHS had a competitive advantage, all right, but according to Bob Kretz, vice president of operations and services for Baxter Healthcare Corp. (the company produced by the merger of AHS and competitor Baxter Travenol in 1987), that advantage lay in the long-standing systems and processes that supported ASAP, not in ASAP itself.

"The thing that really made us successful and gave us an edge was the existence of top-notch distribution, order-entry and inventory-control capabilities," Kretz said. "Competitors could duplicate ASAP in terms of what the customer saw, but in terms of providing the service behind that system, they really struggled."

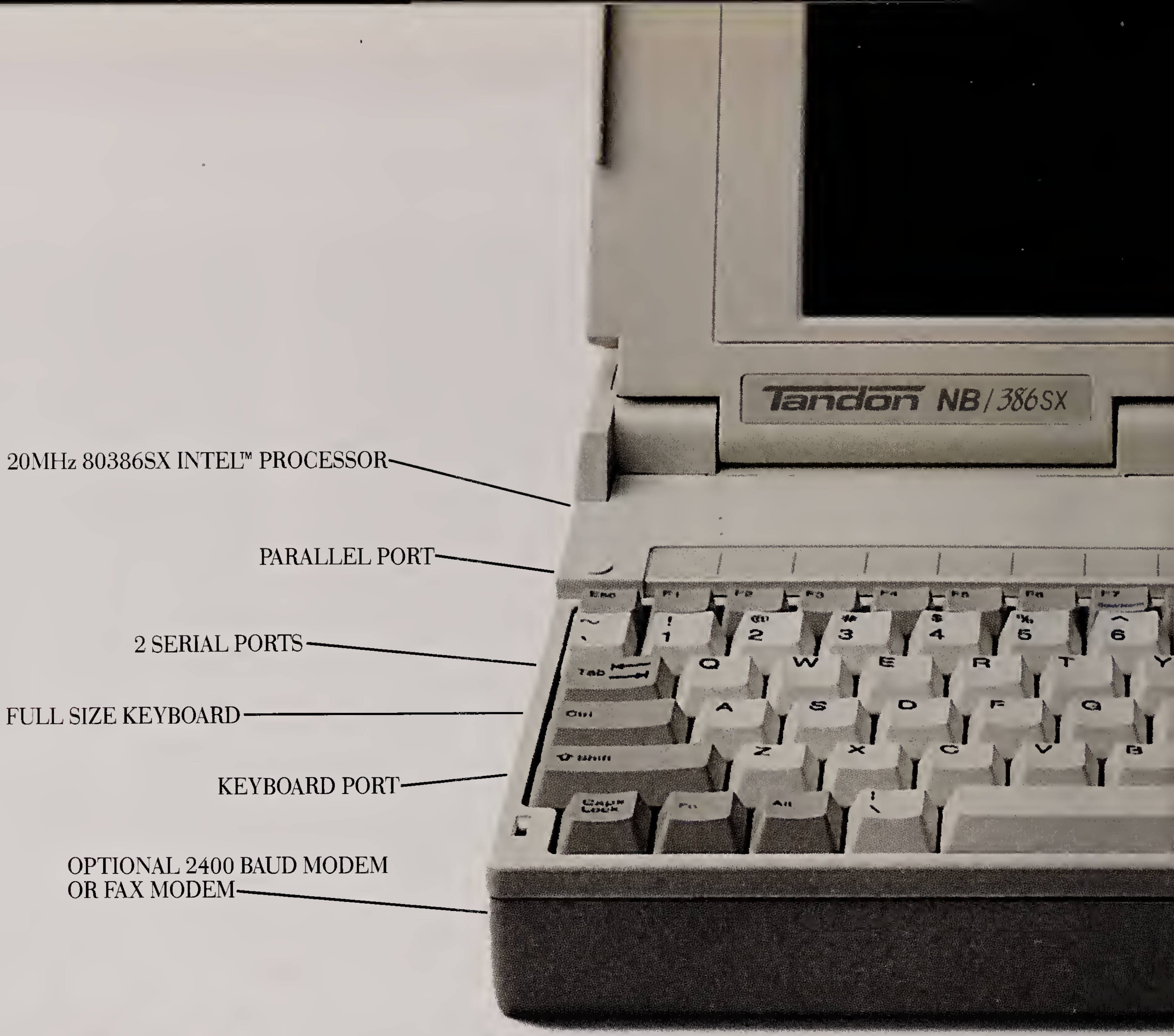
Key among competitors' difficulties in matching AHS's service was their organizational structure, said Kretz. "Our competitors had a number of different divisions, each one with its own set of systems," he explained. "They didn't know how to make themselves look like one company to the customer. Because we were centralized, we could use ASAP to leverage the breadth of our product line." Index's Morison agrees with that assessment, particularly in the case of Johnson & Johnson, a primary Baxter competitor that quickly came out with a system similar to ASAP, to little avail. "Johnson & Johnson had a whole variety of order-processing systems, and that made it hard for them to present a single face to the customer," he noted. "Their business structure of small entrepreneurial units has served them well in the marketplace, but in this case it provided organizational barriers."

> *"You don't want to try to lock your customers up; you want to find ways to better meet their requirements."*
>
> *–Bob Kretz*

As for locking up customers, Kretz said that wasn't part of the ASAP plan. In fact, ASAP was developed shortly after IBM stopped supporting the punch-card reader AHS had been relying on to process customer orders. It wasn't until 1977, after ASAP had been in operation for a few years, that AHS realized it could use the system as a marketing tool. By that time competitors had already introduced similar systems. But even though many AHS customers later rated these competitive systems as equal to or better than ASAP in convenience, they cited AHS's superior service and product line as the reasons for staying with the company. "You don't want to try to lock your customers up; you want to find ways to better meet their requirements," said Kretz. "Our real strategic advantage was our infrastructure; ASAP was just a way of leveraging that advantage." Like American Airlines, Baxter has decided that whatever portion of that advantage would derive from keeping its system to itself is outweighed by the revenues it can reap by offering it to competitors: ASAP now lists competitors' products, for a price, along with its own.

Another classic strategic information system is Otisline, the customer service response system from Otis Elevator Co. in Farmington, Conn. By relaying service calls made to a national dispatch center along to local mechanics equipped with hand-held computers, Otisline has chopped response time and impressed customers. Perhaps more important, said Otis Vice President of Information Systems Don Lucas, Otisline has provided a steady stream of information the company can use for improving its elevators' service records and for marketing maintenance contracts, which provide most of the company's profits. "We keep track of every elevator we've ever built or serviced," said Lucas, "and if we don't service them anymore, that's a potential customer. We even have information on [competitors'] elevators we've serviced. Having this sort of data available down to a branch-office level has changed the way we do business."

Lucas noted that Otisline was developed after an Otis executive got a poor response to a call he placed to one of the local answering services the company had been employing to handle off-hours service request calls. Otis was almost as surprised as its competitors at the cornucopia of information provided by setting up a centralized response system, and at the opportunities this wealth of



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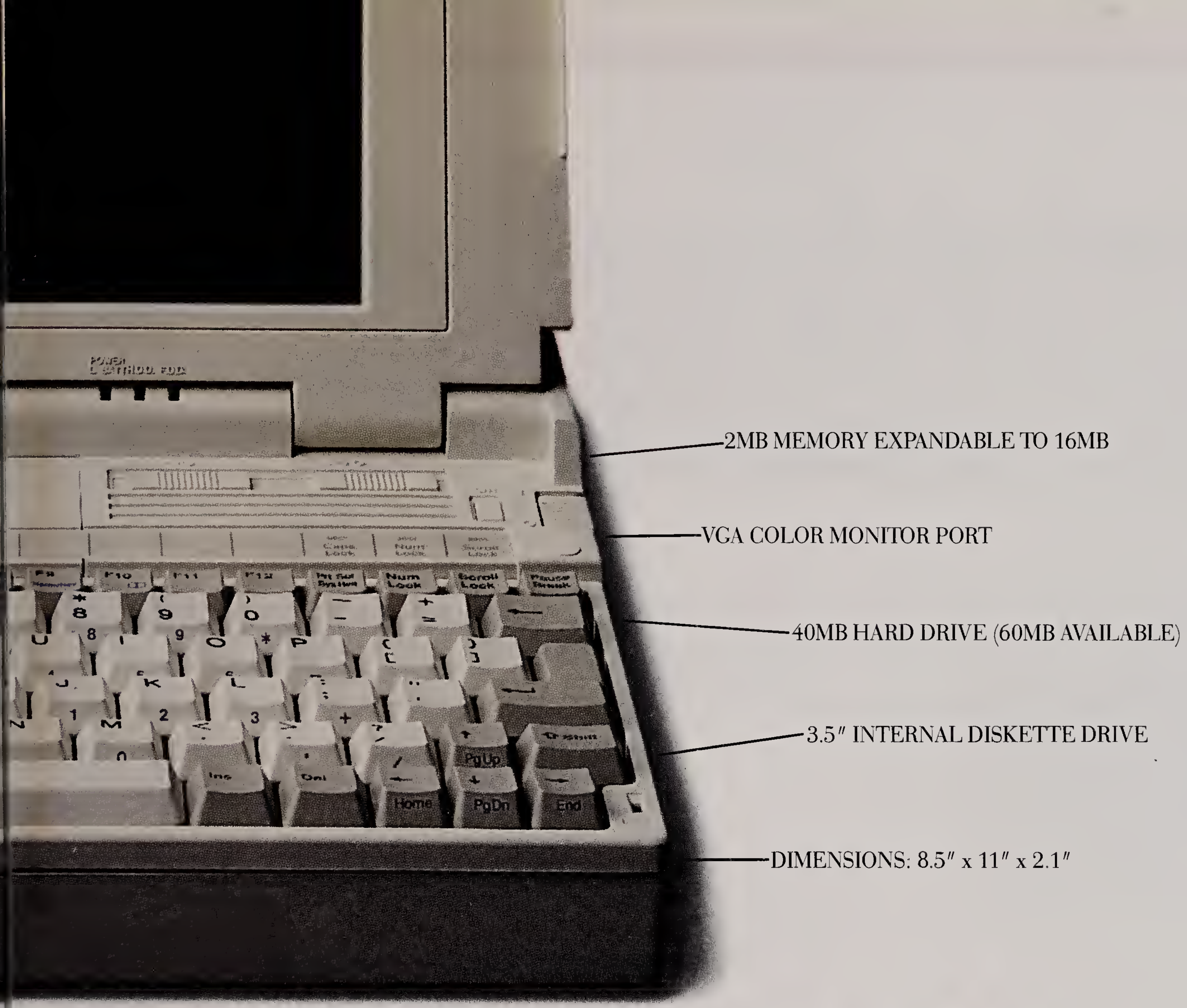
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data conferred. But Otis was ready to take advantage of these opportunities because it had previously developed an extensive set of systems for tracking and analyzing customer and product information; Otisline simply provided a more direct means for supplying the system with fresh data. The company has estimated it would have taken four times as long to develop Otisline if the original systems hadn't been in place.

Did Otisline give Otis a sustainable competitive edge? Lucas insists that it has, but at least one competitor argues that the edge was a temporary one at best. Frank Denig, manager of information services for Schindler Elevator, noted that Westinghouse Elevator (since acquired by Schindler) was able to duplicate much of the functionality of Otisline within months, and most of it within two years. Like Otis, Schindler uses its system not only to respond to service request calls more quickly but also to track its elevators' performance and market its service contracts. Also like Otis, Schindler has been installing remote sensing devices that automatically phone in when an elevator needs servicing. "I don't know of any situations where a customer has decided to go with Otis because they like Otisline better than our system," said Denig.

Denig claimed Westinghouse would have developed an Otisline-like system even if Otis hadn't done it first. "We were both being driven by the same forces." In fact, Denig said, Westinghouse's biggest mistake was doing too good a job of copying Otisline. Later, Schindler decided it would be better served by a system that could funnel service request calls to either a local office or a central facility, rather than the centralized-only approach for which Otis opted. "We respond to customers regionally during prime-time hours and roll it over to centralized dispatch for off-hours," he said. "That's something the regional managers pushed for, to help maintain customer focus."

One of the more recent and attention-grabbing entries in the annals of competitive-edge systems is the Frito-Lay hand-held computer project. By equipping its 10,000-person salesforce with the devices, the company freed up salespeople's time to sell more product, and cut distribution costs in the bargain. But again, the real payoff has come from having a better means for gathering data that can be analyzed to make better product and marketing decisions. To take maximum advantage of that data, noted Frito-Lay Vice President of Management Information Systems Charles Feld, the company is about to roll out a system that will combine the hand-held-supplied data with market data from supermarket scanners and other sources in a form that can be used by local managers to obtain more retail shelf space for the right product mix. "Information about every single bag moved into every store combined with competitive information from scanners makes for a very powerful knowledge base," said Feld. "That project is at least as exciting and will probably have more impact than the hand-held computer efforts."

Will it blow away the head-to-head competition? Not really, Feld said; Frito-Lay doesn't have any direct national competitors. Instead, the company competes against local snack-food manufacturers who tend to have excellent knowledge of the regional marketplace by virtue of their geographic focus. Frito-Lay is counting on its information systems to help address that disparity. "When you're marketing at a national level, you lose that focus and granularity," he explained. "But our data will help level the playing field. As we continue to build better systems, we're evolving into a hybrid organization where we have independent teams of people like a distributed company, but have the technology to connect the teams together like a centralized company."

> *"We're evolving into a hybrid where we have independent teams, but have the technology to connect the teams like a centralized company."*
>
> *–Charles Feld*

The lessons for today's CIOs from Sabre, ASAP, Otisline and Frito-Lay's hand-held computer project seem clear. Rather than trying to build a flashy application that will sew up a market—something that these systems never did—organizations need to construct a broad, flexible IT platform, hone managers' skills at applying information to decision-making, and continually search for more effective ways of doing business with support from IT. "There's an organizational learning component to all this," noted Cash. "When you do it right, you can track transactional activity in all areas of the business and marketplace in a way that permits shaping and implementing new strategies in short periods of time—to become a 'fast-cycle' company, or as some would say, even a 'real-time' company."

If the history of strategic systems is any indication, CIOs are more likely to stumble onto the most valuable IT strategies than to carefully construct them. But if you do stumble on what seems to be the golden system, don't count on blowing anyone out of the water. "Even if you hit a home run," said Schindler's Denig, "the other [guy] can be right back in the game with a couple of doubles." CIO

David Freedman is a freelance writer based in Brookline, Mass.

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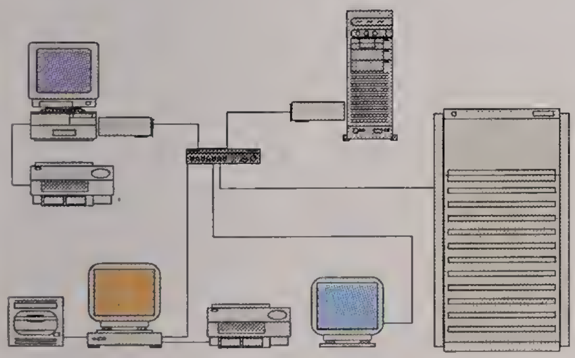

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STARTING OVER

Silo Inc.'s once-outsourced IS department comes in from the cold and begins the long journey toward distributed computing

Alan Weingarden is a realist. For the last four years his job has been to balance the ideal of a centrally controlled, nationally distributed information system with the reality of older systems built to accomplish different ends. This balancing act takes place within the framework of a discount retail chain flourishing on the slimmest of margins, for which the bottom line is always a top consideration. Given the circumstances, the path to distributed processing has sometimes looked more like a slalom course than a road.

Silo Inc. is a 45-year-old consumer electronics and home appliance retailer with stores in 22 states. Typical of the business, margins are extremely low: 1989 before-tax profits were $16.8 million on sales of $892.7 million. Management is willing to invest in information technology provided there is payback on the bottom line.

BY KATHLEEN MELYMUKA

In their quest for distributed computing, **ALAN WEINGARDEN** *(left) and* **BILL SHELTON** *have to work around a clunky inherited infrastructure and a mandate to keep costs low.*

PHOTOGRAPH BY KEN KAUFFMAN

Silo

"OfficeVision fit our plans so perfectly, it seemed as if IBM had been reading our minds."

Frank Fitzsimmons
Director, Judicial Information Systems
17th Judicial Circuit Court of Florida

The idea for IBM OfficeVision™ wasn't born in a Fort Lauderdale courthouse, but it could have been.

The story begins in 1986 when Florida's 17th Circuit Court started looking for ways to get their multiple systems behaving as one.

Says Frank Fitzsimmons, Director of Judicial IS, "It takes a lot of information to move a case through the courthouse, and we're the ones who funnel it. The trouble was, the big end of our funnel was too big and too complicated. We had office software on one platform, and data on another. And the files—the clerk's, the probation division's, the jury room's and others—were set up differently."

The plan.

So they mapped out a strategy for improving data access, communications and service for their 65 judges and staffs.

"We needed some standards, and since our data was mostly in an IBM MVS host, we installed IBM electronic mail and were making good progress at integrating applications.

"Then in '89 my IBM rep said, 'Let's go to a seminar.' The subject was OfficeVision, and I sat there amazed. It matched us so well it was like looking in a mirror. Yet it was going to be much easier, more flexible, and SAA™. We installed OfficeVision/MVS in 1990."

The entire judicial system is now using OfficeVision, mostly on IBM PS/2®s, connected by Token-Ring LANs. Along with E-mail, calendaring and other office functions, it works with both DOS and OS/2® software, plus CICS applications in three regions on the host.

The present.

According to Mr. Fitzsimmons, users and the IS people have both come out ahead.

"It's made life easier for all of us. OfficeVision lets us integrate PC and host applications—across all regions of the mainframe—without making users log on and off all the time. Also, we can customize menus almost instantly. Users see only what they need, and training is easier. We have a help desk, but it almost never gets calls about OfficeVision.

"This place was a paper mill, but no more. And our ability to communicate with each other—remember, we manage the case flow of 65 judges—is vastly improved. Since OfficeVision arrived, we've continually increased our application portfolio and usage goes up 20% every year. That's because people are getting information faster and more easily."

The future.

Frank also has some thoughts on investment protection.

"In government, you buy things a little at a time. You can't upset the applecart too much. That's what's great about OfficeVision—it wasn't a shock to our system, it fit right in. We're running it with brand-new OS/2 machines and 10-year-old DOS PCs. And we're integrating applications that were written by independent groups around the county.

"And as an SAA application, OfficeVision gives me comfort for the future. There have been skeptics, I know, but SAA is real. It lets me look down the road and see around the corners, to know what'll be there.

"As I said, this is government. If you make mistakes, you live with them. For us, OfficeVision was no mistake."

To learn more about the 17th Circuit Court's OfficeVision installation, call IBM at **1 800 IBM-6676,** extension 857.

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In 1987 Weingarden came to Silo as vice president of information systems and technology, just as the company was changing from a large retailer to one of the largest. When he accepted the job, Silo had 100 stores. By the time he started there were 124, and four years later there are 234.

Growth wasn't the only kind of movement going on at Silo. Having sprung from an entrepreneurial—literally mom-and-pop—base, it had just been acquired by U.K. retailing conglomerate Dixons Group plc. Under Dixons, Silo, which had been decentralized into four regions, was to be centralized from its Philadelphia hub.

That's not all. When Weingarden started, all systems—and all IS staff—were outsourced to EDS Corp. of Dallas. But as centralization progressed it became apparent that the arrangement was not working. "The situation with EDS was not a disaster, but it was heading to a disaster," he recalled. "The company felt that they didn't have control of what was going to be a critical piece."

Eventually, Silo and EDS agreed to terminate their seven-year contract, then in its fourth year, rather than attempt to realign it with the new, centralized business strategy.

During the transition from being outsourced to running IS in-house, Weingarden had to think about what would come next. "There was a critical need to centralize," he said. "We had buyers in every region reporting to a regional

> *"There was a critical need to centralize. We had buyers in every region reporting to a regional president, which meant that we didn't have this broad national view of product merchandising."*
>
> *–Alan Weingarden*

Dishing It Out

A cost-conscious retailer turns to VSAT for distributed computing on the cheap

Silo's VSAT network is a nice fit for the low-margin, bottom-line-oriented retailer. "When we compared the cost to any kind of terrestrial network we could build, the cost cards said, 'Do it,' " said Alan Weingarden, vice president of information systems and technology.

VSATs (very small aperture terminals) are small earth stations for satellite transmission that handle up to 56,000 bits of digital transmission per second. For Silo, the fixed costs of a VSAT network were a big advantage.

"Because we are centralizing the data collection process, we're dealing with some pretty long distances," Weingarden said. "[VSAT] is much cheaper because it isn't distance-sensitive. Buy a dish and buy a bucket to carry the information in and as long as you don't exceed the bucket, you're fine. If you exceed the bucket you pay additional charges for the amount of traffic. That's all. Your operating expenses are maintenance on the dishes, which is not a lot, and [excess] traffic."

The only other time Silo incurs additional costs is when it adds new stores. Equipped with a dish and a System/36, new stores are ready to join the network.

Weingarden also likes the freedom from dealing with a variety of regional telephone companies, as would be necessary with a terrestrial network. "In some parts of the country that's a major plus," he said.

As for flexibility, "You want to move a store? Just pick it up and move it," he said. The only potential problem, he added, is getting a permit. "You'll find when the local municipalities give you a hard time about how big your sign is, they give you a hard time about where your dish is."

VSAT has also been more dependable than a comparable terrestrial network. "You may take as many outages as you would in another kind of network," said Bill Shelton, director of information systems, "but they last for less time, typically."

"For the cost there's less risk," said Weingarden. "At comparable costs it is a more stable network. If I were down to that nth degree of availability, I probably could do better with other technologies, but that's a degree of difference that doesn't matter to us. Given that we have a processor that can ring sales for the customer in the store even if the network goes down, there's a point you hit where the extra cost just isn't justified."

"You get equivalent risk at two-thirds the cost or even less than that," said Shelton.

Finally, for a small additional investment, the VSAT can provide one-way video to the stores for an electronic version of the hands-on managerial style of the entrepreneurial days. "It's not implemented yet," said Weingarden. "[But] it's something to look at."

–K. Melymuka

president, which meant that we didn't have this broad national view of product merchandising. We [are] moving toward a central management system, one group of merchants, one national posture on product lines—[all of which is] critical not just for economies of scale but also for national focus and consistency of image."

Equally critical, however, was Silo's desire to maintain "what made the company grow for so many years, which was a sensitivity to each individual market in the country," Weingarden said. But developing an IS philosophy to complement the business would have to wait. "First of all," Weingarden recalled, "we had no staff."

Weingarden had to hire an entire IS staff, and one of his first moves was to call in Bill Shelton, a former colleague from BATUS Retail Group in Trenton, N.J., as director of information systems. Shelton provides a counterpoint to Weingarden in personality, priorities and style. "My job is to be the idealist," Shelton said.

"And my job," said Weingarden, "is to say, 'How much is it going to cost?' I want to [build the systems], and we've always looked for the way, but the real issue is what's the mission of the company and how does this affect the bottom line?"

With the EDS transition completed this past winter, Weingarden finally owned IS; but it was not the IS of his dreams. "EDS had been bringing boxes together as opposed to putting systems together," Weingarden said, "and in some cases Rube Goldberg could've designed those interfaces."

The IS organization Weingarden inherited was divided into four more-or-less stand-alone regions, each with two IBM System/38s that run a raft of cloned applications including sales, audit, payroll, inventory and accounts payable. The twin '38s need to talk to each other, and all need to talk to the AS/400 inventory database in Philadelphia headquarters. "That begins to give you an idea of the rat's nest," said Shelton.

SILO *is striving toward a central management system to help it achieve a broad national view of product merchandising.*

PHOTOGRAPH COURTESY SILO INC.

Weingarden may replace the '38s with a Tandem or IBM mainframe, or he may outsource that piece to a service bureau. Whichever alternative he chooses, he plans to move mission-critical functions off the System/38s by Christmas.

More pressing than getting the mainframe in place was the need to establish a consistent, long-term infrastructure, and Weingarden settled on a nationwide satellite network. "That gives us, at relatively low and fixed cost, a true telecommunications network as if we had leased lines," Weingarden said (see related story, Page 54).

Keeping the infrastructure flexible is crucial, explained Shelton. "Our current system can far exceed [our present needs], but it costs us nothing extra to put the design in place that would facilitate something we might want to do in a year."

Even while the transition from EDS was under way, Weingarden and his brand new staff managed to develop two new systems. The VSAT made possible an efficient, centralized credit-card authorization system. Weingarden also rolled out a distributed inventory management system "designed to help us have the right goods at the right place at the right time at the least inventory count," he explained.

"The design of those pieces fell into our strategic plan," Weingarden said, although no formal plan was in existence at that time. "We knew where we wanted to go very broadly, but what was on our plate was survival."

Weingarden has dubbed the vendor end of the inventory system "little EDI." "It means that in some cases we have their systems in here and we're taking data off manually, and in other cases we transfer information. But what we're not doing yet is to have that switch in the middle that goes, 'Swwwtt.' " That's a project scheduled for this year.

For the many vendors in Japan with whom the company does business, however, even little EDI is impossible. "You can't participate well in just-in-time if you're that physically separate," Weingarden said, adding that the growth of EDI is pressuring foreign companies to put manufacturing facilities closer to consumers.

Weingarden got top executives on board for the inventory management project by showing them loss of sales and extra inventory coming out of the Christmas season under the old manual system. After implementing the new system, he was able to demonstrate "better sales [and] on-inventory targets." The correlation was obvious to everyone, he said, even "those people who weren't in tune with what technology can do."

Generally, however, Weingarden doesn't need to push management into systems. Every system has a business sponsor who stands to gain from its implementation and runs interference for IS. Weingarden lays out the potential costs and benefits of a proposed system and the sponsor takes over. "The sponsor has to take that document, believe in it, present it to the executive committee to get that project funded and approved," Shelton said. "People are brought into it by the business sponsor."

Weingarden himself has considerable influence in the corporation by virtue of his membership on the Silo executive committee. "The driving force behind the company is that technology is part of the business and an important part," he said.

But there is still a need for education. Silo management is a mix of longtime employees who have a keen understanding of Silo's business and new people with an understanding of what systems can do for retail, he said. "Putting those two together has been a continuing challenge."

Weingarden credits parent company Dixons for having a good appreciation of technology. "Everybody's willing to accept anything that can move profits to the bottom line," he said. "We're not ever fat, dumb and happy. [Systems] are expensive, but they're invested in for the return. That's what gets us going; that allows us to make an investment."

But you can't live on goodwill. "We continue to sell each piece," Weingarden explained. "It's a matter of pointing back to [successes] and then selling. It's a matter of sitting with the executive committee and explaining, and it's a matter of people like Bill working with the line managers."

Finally, Shelton said, successful education depends on management's perception of IS. "Even if they don't understand what you're driving at, if they know you care and you've delivered and you've been honest about your assessment of things, you're going to get a good reception. If they think what you care about is only writing good systems, you're dead."

Looking down the zigzag road, Weingarden has projects on the drawing board in customer information, expense control and better business analysis through exception reporting. "The thrust really is to continue to do things that will enhance customer service and at the same time squeeze more bottom-line dollars out of every dollar of sales," he said. "The other piece of planning is the building of the infrastructure that will support [applications] and allow them to continue to evolve, because I guarantee a year from now there will be new issues added and old ones deleted."

"What we're trying to do," said Shelton, "is avoid the sin of our business: Even though it may be really neat to put a distributed piece of gear out there, if the best way to do it is to use a central system or to have a pad [and] a pencil and write it down, then do that."

"We want to push information to the lowest level of the corporation that is reasonable for decision-making," Weingarden said. "That really defines our whole desire to distribute."

"It ain't that tough if your understanding of the business is correct," said Shelton. "It is tough if you get that wrong."

Weingarden understands the business well enough to know that it can't stand still while he builds the perfect system. He has to work with what's there now, even though interim results may not be as pretty as he would like. "The critical thing that we believe here is do something. Don't talk about it, don't play with it, just do something. If you do something, people will invest in you to do more. It's that simple." CIO

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.

TECHNICAL PROFILE

Silo Inc. is a consumer electronics and home appliance retailer with more than 230 stores in 22 states. It is a subsidiary of Dixons Group plc, a U.K. retailing conglomerate. Before-tax profits in 1989 were $16.8 million on sales of $892.7 million.

Large and Mid-Range Systems: In the past three years, Silo management has moved from regional to central, and its systems are in the process of following suit. IBM System/38s in each of four former regional centers interact with a central, fault-tolerant Tandem CLX and an IBM AS/400 at Philadelphia headquarters. IBM System/36s running point-of-sale and credit-card authorization programs in each of the stores communicate via a VSAT network with the Tandem CLX. Plans call for replacement of the System/38s with an IBM or Tandem mainframe, or possibly outsourcing. The '36s, too, will eventually be replaced by more appropriate hardware.

Software: Silo uses Island Pacific Merchandising from Island Pacific Inc. of Newport Beach, Calif., for inventory and Cross Point Retail Management System from CACI Systems Integration Inc. of Fairfax, Va., for credit authorization.

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Learning from Experience

The best place for a fledgling employee to learn the business may be under the wing of someone who already knows it

BY STEWART L. STOKES JR.

For IS professionals, learning more about the businesses their systems support is a mandate for the '90s. Information about products, markets, customers, channels of distribution, corporate cultures, strategies and politics are no longer merely nice to know: They are need-to-know survival skills. Professional trainers, lecturers and seminar leaders are all valuable sources of information. But the best way to learn the ropes may be from someone who has already climbed them.

Systems professionals are learning about their customers' businesses through a combination of high-level structural changes and new operational strategies. Structural changes encompass a variety of organizational redesigns, including decentralization, the dispersion of IS personnel into strategic business units and the creation of IS profit centers. More and more "hybrid" IS organizations are emerging as IS structures increasingly support and complement enterprisewide strategies.

ILLUSTRATION BY WARREN GEBERT

New operational strategies include internships for IS personnel in line departments, briefings by line managers whose business units are supported by IS, and (far too) occasional opportunities for IS personnel to accompany their internal customers on visits to external customers.

One strategy that has been pursued for years in line departments and that can be used more extensively by IS is mentoring. In mentoring, experienced senior members of a department or organization establish informal relationships with less experienced junior colleagues to pass along knowledge, act as advisers and sounding boards, and help their "mentees" navigate the culture and politics of the organization.

One IS executive whose career has been shaped by mentoring is Brad Sweet, senior director of MIS development at Wang Laboratories Inc. in Lowell, Mass. "I can recall two instances where mentoring played a significant role in my career," Sweet said. "In the first situation I had both a mentor and a mentee relationship with an individual who migrated into information systems from human resource development. It was an ideal relationship because he needed me to help him with the technical side of the job, and I needed him to help me understand what it would be like to be a manager. He had tremendous people skills, and I knew these would benefit me.

"My other major mentoring relationship was [also with] a non-IS manager to whom I reported. He sensed I had potential. His style, however, was [more] aggressive; he would challenge me at every turn. He wanted to see how much I would take. Finally, one day after a particularly grueling session, he told me what he was up to. We then evolved into a more positive relationship. I learned some important analytical and general business skills from him."

Mentoring by senior non-IS managers can introduce IS professionals to unfamiliar areas of the organization. One senior systems executive, who has worked in IS and

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THE MAGAZINE FOR INFORMATION EXECUTIVES

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TRENDLINES

DON'T FORGET THE NAILS

For the weekend renovator unaccustomed to drawing up workable plans and estimating and selecting building materials for do-it-yourself projects, the Weyerhaeuser Co. is now offering one of the more interesting computer-based kiosk applications.

Weyerhaeuser's DesignCenter, which debuted recently in building-supply and home-center stores, automates the project design and estimating process. While the marketing aim is to boost sales and employee productivity at the retail outlet, the added value to the do-it-yourselfer is in time, money and aggravation saved.

The system is fast (10 to 15 minutes to design a deck) and accurate (providing exact materials costs). Currently the kiosks are programmed only for decks, but garages, shelving units and other projects will be added to the system soon.

To operate the kiosk, a store employee uses a simple trackball device to prompt the customer through the design. Customers can opt for a deck that is either attached to the house or not, anywhere from ground level to six feet high, with one level or two.

Once the dimensions are set, the customer chooses the type of decking and the direction it will run in. A variety of railing styles are offered, with different balusters and headers, depending on the customer's tastes and budget. The system automatically sets the correct joist, beam and support-post placement.

Finally, when the design is complete, the system displays a detailed, 3-D image that can be manipulated on screen to show any angle, top to bottom, right to left. Another prompt shows the cost of materials for the current design. Too expensive? Try a simpler baluster style or trim down the square footage—then compare the two designs and costs side by side.

When the customer chooses a final plan, the DesignCenter prints out a 3-D color depiction of it, along with construction details, an itemized materials list (with current prices) and a "how-to" booklet on basic deck construction. (These are usually available only with the purchase of the project.)

The DesignCenter, which has been nominated for the *Computerworld*/Smithsonian awards for technology innovation, is the product of Innovis Interactive Technologies, a subsidiary of Weyerhaeuser. The kiosk was created, said Innovis President Mark Lembersky, as "a way to provide a value-added [service] to retailers that would help improve the store's image and sales and, at the same time, deal with the shortage of skilled workers on the store floor." Lembersky called the kiosk "remarkably easy to use," and reported that "almost all salespeople become proficient in 15 minutes."

ILLUSTRATION BY HAL MAYFORTH

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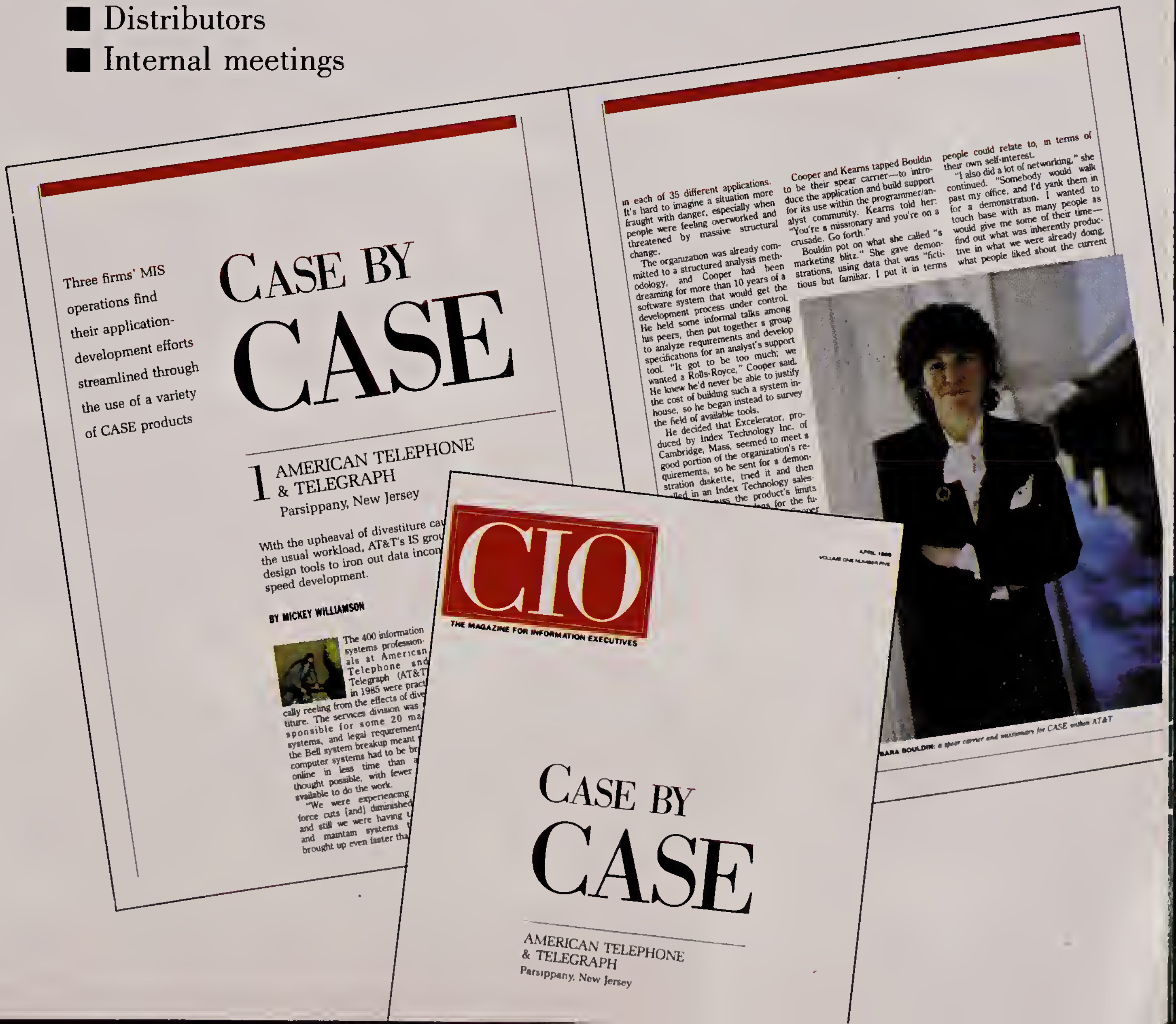

Three firms' MIS operations find their application-development efforts streamlined through the use of a variety of CASE products

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With the upheaval of divestiture cau
the usual workload, AT&T's IS grou
design tools to iron out data incon
speed development.

BY MICKEY WILLIAMSON

The 400 information
systems profession-
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titure. The services division was
sponsible for some 20 ma
systems, and legal requirement
the Bell system breakup meant
computer systems had to be br
online in less time than a
thought possible, with fewer
available to do the work.
"We were experiencing
force cuts [and] diminished
and still we were having t
and maintain systems
brought up even faster tha

in each of 35 different applications. It's hard to imagine a situation more fraught with danger, especially when people were feeling overworked and threatened by massive structural change.

The organization was already committed to a structured analysis methodology, and Cooper had been dreaming for more than 10 years of a software system that would get the development process under control. He held some informal talks among his peers, then put together a group to analyze requirements and develop specifications for an analyst's support tool. "It got to be too much; we wanted a Rolls-Royce," Cooper said. He knew he'd never be able to justify the cost of building such a system in-house, so he began instead to survey the field of available tools.

He decided that Excelerator, produced by Index Technology Inc. of Cambridge, Mass, seemed to meet a good portion of the organization's requirements, so he sent for a demonstration diskette, tried it and then
alled in an Index Technology sales-
uss the product's limits
ans for the fu-
ooper

Cooper and Kearns tapped Bouldin to be their spear carrier—to introduce the application and build support for its use within the programmer/analyst community. Kearns told her: "You're a missionary and you're on a crusade. Go forth."

Bouldin put on what she called "a marketing blitz." She gave demonstrations, using data that was "fictitious but familiar. I put it in terms people could relate to, in terms of their own self-interest.

"I also did a lot of networking," she continued. "Somebody would walk past my office, and I'd yank them in for a demonstration. I wanted to touch base with as many people as would give me some of their time—find out what was inherently productive in what we were already doing, what people liked about the current

BARA BOULDIN: *a spear carrier and missionary for CASE within AT&T*

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CASE BY
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& TELEGRAPH
Parsippany, New Jersey

non-IS areas here and abroad, feels that U.S. companies have difficulty developing well-rounded executives who understand the enterprise as a whole. "The cross-functional training of senior managers is very poor here," he said. "We build within the functional areas and develop strong functional managers, but we don't enable them to grow beyond their functional area responsibilities."

Sherron Laurrell, IS manager of support services at Scott Paper in Philadelphia, defines a mentor as "a senior person who takes the risk to be open and forthright with you on things you are doing right—and doing wrong—and who also provides counsel to you on how to strengthen your good points as well as changing the not-so-good."

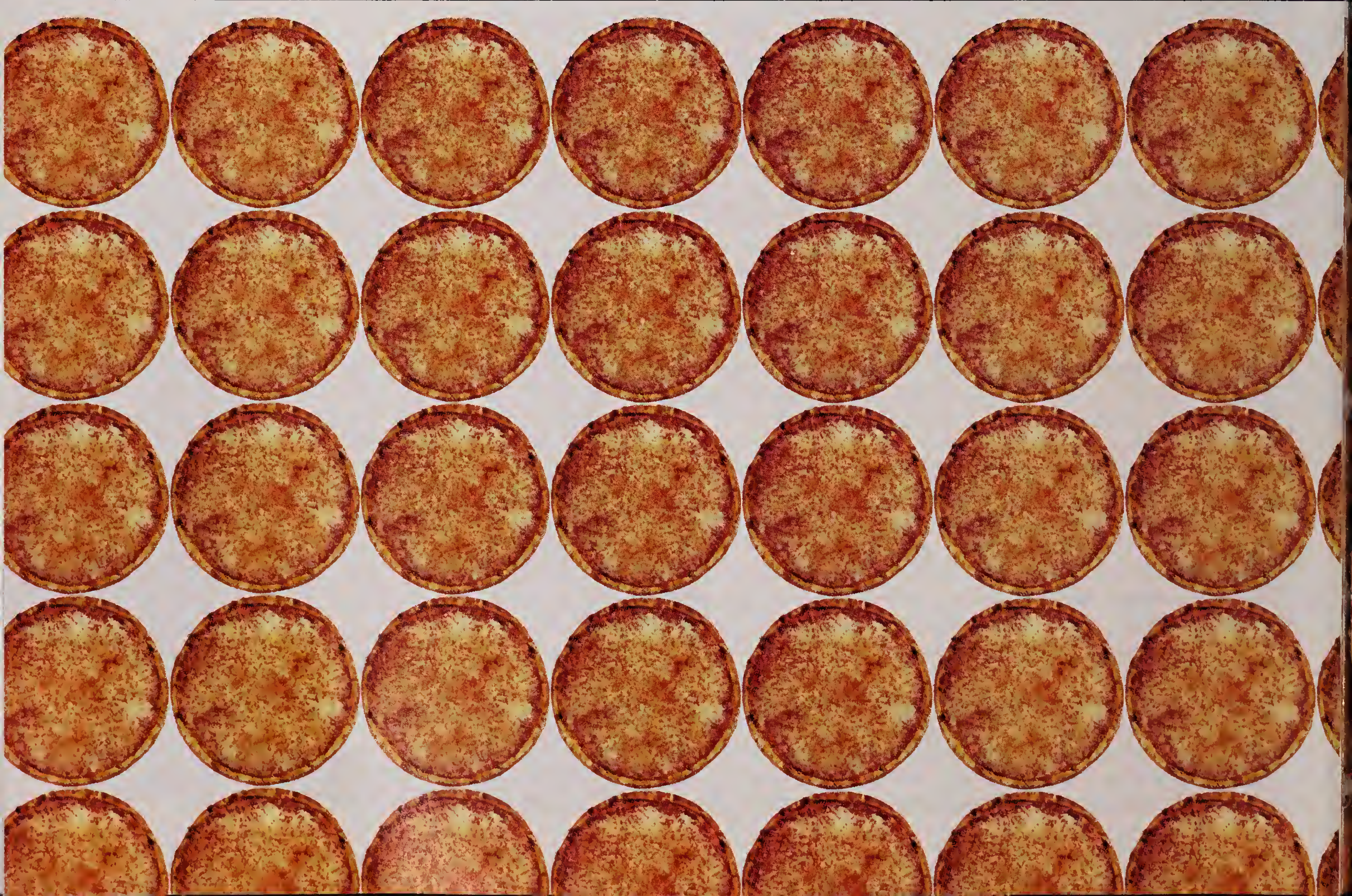
For Laurrell, that person was her manager, Director of Worldwide Systems Stephen Finnerty. Their mentoring relationship began several years ago, when Laurrell found herself in danger of being "written off" as a key contributor within the IS department. "I thought that if I did a good job, I would be OK," she explained. "I didn't pay attention to where the power bases were and I was about to derail. I found that being functionally competent wasn't enough. Steve gave me some blunt and savvy advice regarding the political skills I needed to develop. For instance, he pointed out that I was more focused on being right and impressing senior colleagues than learning from them. The specifics of his feedback stung at first, but I soon realized that political skills were fundamental to advancing my career."

> *"The specifics stung at first, but I soon realized that political skills were fundamental to advancing my career."*
>
> *–Sherron Laurrell*

Mentoring also played a significant role for Anthony A. Vallario, senior vice president of corporate information resources at Bergen Brunswig Corp. of Orange, Calif. From such a process, "I learned the managerial style of our senior executive team, including integrity, honesty and openness," he said. "They helped me learn to manage by example, and I've tried throughout my career to do this with others. They also taught me not to talk about other people, and certainly not to downgrade them."

Another advantage of mentoring is that IS managers who have benefited from such a relationship are likely to turn around and offer guidance to junior colleagues. Scott Paper's Laurrell now counsels others both inside and outside her chain of command. And Wang's Sweet actively promotes mentoring at his company.

"We might spot a high-level individual contributor who would like to



move into management," he explained. "I might bring this person aboard as a staff assistant to shadow me, participate in staff meetings, take notes and do special projects. After several months, this person would move on to a new assignment, and we would rotate another person in."

The IS organization at Boeing Computer Services in Ridley Township, Pa., has demonstrated its commitment to the concept by establishing a two-year mentoring program. BCS will soon graduate its first "class" of 20 mentees, and another 20 have already started.

The program was initiated because BCS determined that it needed to do a better job developing IS managers, according to John Nolan, manager of human resources. It features classes held both inside and outside the company, visits from speakers, and an individually determined segment that may include activities such as shadowing. Participants are not mentored by their direct managers, giving them "exposure to different managerial philosophies, and other areas of business within Boeing Computer Services," according to Walter Stecklair, a senior technical specialist.

One lesson that Boeing has learned from this experience is that the mentees have to make it happen. "We can't do any more for mentees than they want to do for themselves," said Nolan. "We can do a great deal for those most interested in their upward career mobility, but not everyone is."

Mentoring is used less widely in IS than in other functions. Yet information systems is one area where mentoring has the potential to have a significant positive impact. "To be a good IS executive, you have to be a people person," explained Bergen Brunswig's Vallario. "The perception is that we in IS are the techies, and that we're not people-oriented. We have to get our people out more, into courses, conferences and professional associations. I always have reminded my people that these are . . . real work and will help make them successful."

"Mentoring is very limited within IS," said the senior systems professional. "We need to understand that mentoring adds value to what we do. Systems professionals who have an enterprisewide point of view help develop better systems."

"I believe IS managers need to put in place more thorough human resource programs which include mentoring as a part of a personal development strategy," said Wang's Sweet. "We need to do a better job in our organizational planning and career-path planning, and include managing people in our performance review and appraisal processes.

"Because IS managers are not paying attention to their human resources," Sweet continued, "we're turning people over; we're losing the good people, and this is costing us money. We have a lot of work to do, and mentoring is part of it." CIO

Stewart L. Stokes Jr. is senior vice president at QED Information Sciences Inc., in Wellesley, Mass.

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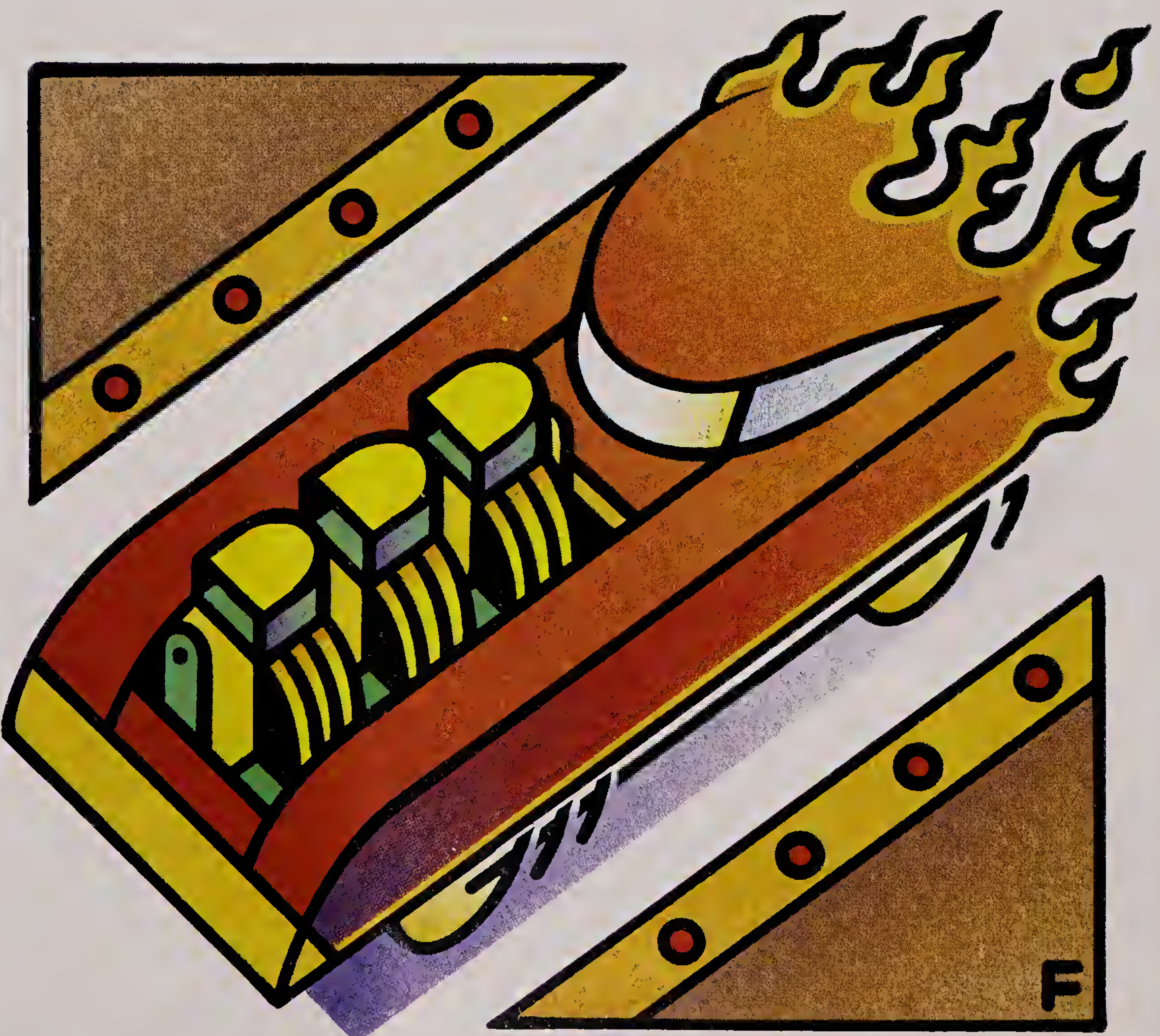
Souped Up Supercomputers

To reach the next level of computing performance, manufacturers are "bolting together" multiple processors and running them in parallel

BY SCOTT WALLACE

About 30 years ago, a young automotive engineer named Don Garlits developed a method of overcoming the horsepower limitations of the conventional Detroit gasoline engine: He bolted two engines together. For quite a while, "Big Daddy" Garlits was first to the checkered flag, and he remains one of the all-time big money winners at the drag strip.

Today a generation of computer dragsters—supercomputers with names like Cray and Cyber—are facing a similar limitation. But today's challengers aren't just bolting together two engines. The entrenched leaders of supercomputing are facing machines with 16, 128 and even 65,356 engines. The design problems associated with "bolting together" that many compute engines are daunting, but not as daunting as defying the laws of physics.



Computers, whether PCs or supercomputers, use electricity for internal signals and timing. Improvements in processing speed have brought systems within sight of the physical limits of electronic computing. Major advances in computing speed and power will require more than faster chips and shorter circuits.

Many computer companies—Cray among them—are betting that the way to go beyond the performance limitations of conventional computing is to compute unconventionally. Specifically, this means building systems with several computers that function simultaneously and in parallel. Conventional computers, sometimes called scalar computers, operate sequentially: One instruction is performed at a time. When that instruction is completed, the next is initiated and so on. Instructions don't take much time to execute by human reckoning, and so computers appear to work at very high speeds.

In the past, the very highest performance computers combined a scalar and a vector processor. Vector processors operate on multiple data in the same instruction cycle. In a vector computer, a table of data—each element of which is to undergo the same mathematical manipulation—can be processed in clumps by a single instruction rather than one table entry at a time. Since the duration of an instruction cycle is the limiting factor to computer speed, doing more in each cycle improves performance while still obeying the laws of physics.

Parallel computers take performance a step beyond vector computers. In a parallel system, several "computers" operate in tandem. Parallel systems incorporate a number of both scalar and vector units, thus of-

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fering multiples of the computing power available from conventional systems equipped with vector units. A four-processor parallel system of perfect efficiency would process a table of data in one-fourth the time a single processor system would require. However, in the real world, coordinating the operation of processors within a parallel system requires compute power and time; thus no parallel system is perfectly efficient.

Interprocessor coordination isn't the only limiting factor. Even more critical is the software that parallel systems run. This software must either be handcrafted to take advantage of multiple processors or be passed through a "parallelizing" compiler. Unfortunately, neither of these options is very feasible today.

Parallel software is highly challenging to code manually, grueling to debug, and extremely time-consuming to optimize. In fact, aside from proof-of-concept prototypes and extraordinarily valuable applications, hand-coding for parallel processing is simply not an option. The other choice—using a compiler to modify sequential code for parallel systems—is likewise limited. Such compilers are in the early stages of development and are not yet available as "commercial strength" products. Further, it is doubtful that either hand-coding or today's parallelizing compilers will be viable for parallel systems with more than a half dozen or so processors. This lack of software development tools is the single largest problem parallel systems face in migrating from scientific and extreme-value applications to more traditional commercial computing.

Another inhibiting factor is a general lack of awareness on the part of corporate decision-makers regarding how high-performance computing can benefit their corporations. Given this general lack of knowledge, it's hardly surprising that there is little understanding in the business community of what specific applications are appropriate for high-performance parallel systems.

What is surprising is how many corporate applications are well-suited to parallel implementation. Database analysis, file management, resource optimization, visualization, graphics and both numeric and image processing are all inherently parallel applications, involving either a multiple-user process that is performed repeatedly or a single-user process that can be readily broken into repeating component processes.

Many computer companies are betting that the way to go beyond the performance limitations of conventional computing is to compute unconventionally.

Portfolio analysis and optimization is a good example. A broker applies a complex but valuable analysis to each stock when talking with clients about portfolio performance. A conventional computer might perform this analysis on each of the client's 10 stocks sequentially to display a performance report in, let's say, 300 seconds. A parallel system, with 10 of the same processors as the conventional system, would assign the analysis of each of the stocks to a separate processor and assemble the 10 completed analyses into the performance report in about 40 seconds. Obviously, the speed of the parallel system provides the broker with a flexibility and spontaneity that has real value for the analysis and for the client. And, in a wide variety of circumstances, a parallel system offers improved price/performance as well.

Despite the problems, there is an increasing level of commercial interest in high-performance computing, according to Louise D. Nielsen, IBM's director of High Performance Computing Solution Development. "[New] technology and the power it offers at the right price . . . has suddenly enabled commercial users to look at larger [business] models—bigger problems—and get tremendous value out of that," she said. "You can find it in the finance and securities environments. You can also see it in the industries which had optimization problems that weren't portfolio related, like the transportation industry or process industries."

Both the price/performance benefits of parallel systems and the systems' ability to reduce turnaround times are powerful incentives for users to examine the way they currently support their applications and their operations. "It's not things that commercial users didn't know how to do before, but parallel things that they previously did sequentially," Nielsen said. Nielsen predicts there will be "tremendous growth" in database and transaction processing applications, as well as in all the more traditional high-performance computing applications.

As prices drop and high-performance systems become less a commercial oddity and more a competitive necessity, the market is projected to expand from its 1990 level of $20 billion to almost $30 billion by 1995, according to Santa Clara, Calif.-based InfoCorp, a division of the Gartner Group. By 1995, parallel supercomputers will hold over 72 percent of this market, the organization predicts, experiencing a compound annual growth of 37 percent during this period—five times that of the overall high-performance market. Traditional supercomputers during the same period will show "a dramatic loss of share and . . . negative compound annual growth."

One reason for the negative growth of traditional supercomputers is that these systems have provided high performance by pushing the limits of chip, input/output and memory speeds, at rather extreme expense. In spite of this, the processor of a Cray Y-MP, arguably the fastest uniprocessor available, provides only twice the peak MFLOPS (millions of floating point operations per second—a measure of work somewhat more representative of usable system power than MIPS) of the original Cray-1. In the same 10-year period between the introduction of the

The lack of software development tools is the single largest problem parallel systems face in migrating from scientific and extreme-value applications to more traditional commercial computing.

Cray-1 and the Cray Y-MP, microprocessor performance has improved nearly a hundredfold. (This improvement is significant even though microprocessors were not starting from a point of serious optimization.) Additionally, parallel architectures enable manufacturers to assemble microprocessors into systems offering a smooth continuum of power.

BIS Strategic Decisions, a market research and consulting company in Norwell, Mass., projects that by 1995, half of all mid-range computers and servers will be Intel x86-based, taking advantage of the microprocessor's market acceptance and software base and the price/performance benefits that volume manufacturing provides. By 2000, BIS projects, 85 percent of end-user hardware and 40 percent of all mainframes and mainframe-class servers will be x86-based.

As parallel systems drive the cost of MFLOPS down, it's reasonable to expect both manufacturers and third-party software vendors to develop parallelized applications, application toolkits and cross-compilers that port software running on conventional sequential computers to parallel systems. The development of the minicomputer software industry two decades ago provides an example of how this might occur.

While there is no widely accepted taxonomy of parallel systems, it's useful to think of three classes of parallel computers. Within each category, vendors take widely varying approaches to system design, using different processors, memory structures and interprocessor communication schemes.

Systems that integrate from two to eight processors can be regarded as "lowly" parallel, and are most likely to be closest in architecture to traditional scalar systems. Those that integrate from eight to 128 processors are "moderately" parallel and often offer a conventional architecture combined with major increases in power. Systems with more than 128 processors are "massively" parallel; these offer the greatest power but have few architectural similarities to conventional systems and usually require significant restructuring of algorithms and problem-solving approaches.

Lowly parallel systems are manufactured by a number of vendors, including IBM, the Apollo Systems Division of Hewlett-Packard, Convex Computer Corp. of Richardson, Texas, and Stardent Computer Inc. of Concord, Mass. The Stardent 3000 series, incorporating two, three or four MIPS 3000 RISC processors, is used by Picker International Inc., a manufacturer of diagnostic imaging equipment, as the heart of its medical imaging and visualization product, ViStar. ViStar interfaces to Picker's magnetic resonance imaging scanners and provides sophisticated, interactive visualization and analysis of magnetic resonance, computed tomography, and other diagnostic images.

Moderately parallel system manufacturers include Intel Corp.'s Supercomputer Systems Division in Beaverton, Ore., and Alliant Computer Systems Corp. of Littleton, Mass. An Intel iPSC/860 system with 32 Intel i860 RISC processors is used by Prudential Bache Securities for a number of broker applications. An Alliant FX/2800 with 28 i860 processors is used by Mazda to support a real-time vehicle simulator that includes a six-axis hydraulic movement system, instrument panel and full-vision cockpit. The Mazda system allows engineers to modify vehicle design parameters such as suspension stiffness and wheel camber and to "experience" as well as mathematically analyze changes in vehicle performance.

Massively parallel systems are manufactured by nCUBE in Belmont, Calif., and Thinking Machines Corp. of Cambridge, Mass., among others. An nCUBE system, typically configured with 1024 64-bit custom processors, is used by Shell Oil Co. for analysis of geophysical exploration data. A Thinking Machines' Connection Machine with 32,000 one-bit processors is used by Dow Jones Information Services to provide a context-sensitive English language interface to Dow's business and financial databases.

NCR Corp. of Dayton, Ohio, is covering all bases with its System 3000 family of computers. Ranging from single-processor, portable models up through not-yet-available parallel systems with more than 1,000 processors, the 3000 series is based on Intel x86 processors. Many parallel system vendors are in the process of porting brand-name commercial software to their products, and end users should be able to buy parallel database and transaction processing software within the next year.

Most organizations can do without the ultimate in computer power, and few have technical staff comparable to "Big Daddy" Garlits. But as parallel systems make available faster, cheaper computing, and as parallel applications mature and create commercial opportunities unavailable today, many organizations will make the dash for the checkered flag and the big money. The number of commercial organizations today investing heavily in parallel technology (although they are unwilling to publicly discuss their projects) suggests that the sweet spot for parallel systems investment is rapidly approaching. With this new breed of computing, there's risk in jumping off the starting line too soon but more risk in being left behind. CIO

Scott Wallace is an independent computer industry analyst and journalist in Warwick, Mass.

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Crowning Achievement

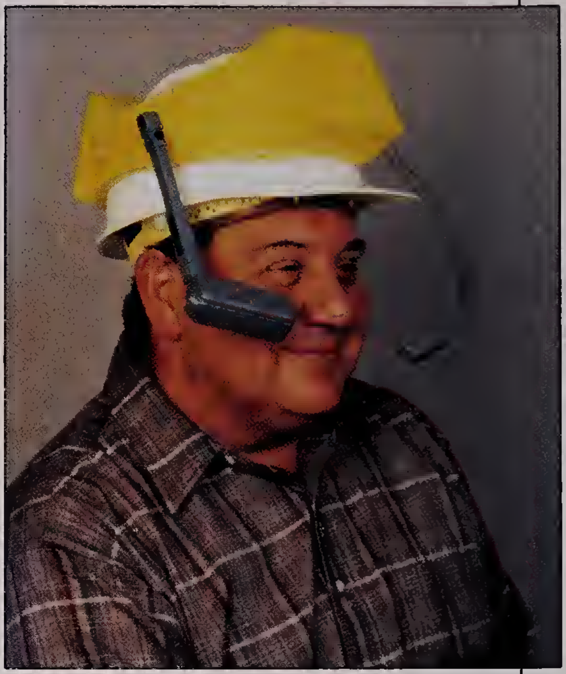
When it comes to portable computers, Park Engineering is thinking a head.

CompCap, the company's new one-pound device, is designed to be worn as part of the work uniform: either built into a hard hat, or attached to the head by a soft band with the electronics built into a belt or vest. A miniature display called the Private Eye is positioned close to the user's face: This virtual screen provides the equivalent of a full-size 12-inch monitor, yet weighs only two ounces. Its image, which appears to float a few feet in front of the user, displays 720 by 280 pixels and can be used to show either graphics or text.

CompCap also uses a voice data entry system, enabling hands-free interaction with the device.

The product offers 4MB of on-board RAM with options such as memory card interface, a custom-designed keypad interface and bar code reader. A radio link will be offered later this year.

Prices range from $1,500 to $3,000, depending on configuration. For more information call 509 487-6462.



Seventh Heaven

Like the famous wine maker, Apple Computer Inc. sells no operating system before its time. The long-awaited System 7 enhancement brings with it a host of third-party-developed compatible software, hardware and support products that will leverage its new capabilities.

Those include an interface that promises greater ease (and speed) in accessing and integrating applications and data; multitasking; virtual memory and 32-bit addressing; and extension of the Mac "copy-paste" metaphor to enable users to link separate documents so that updating one will automatically update the other. System 7 is compatible across the entire Mac line and with most existing Mac applications.

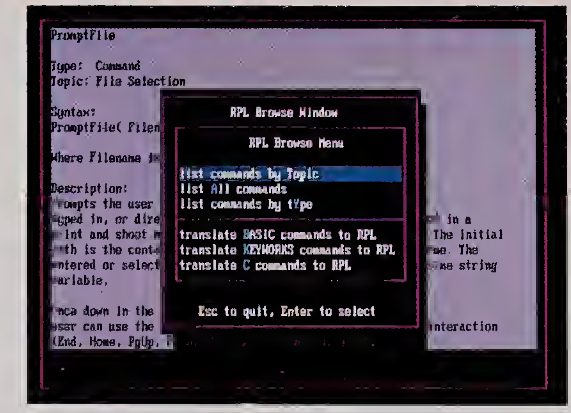
Among the hundred or so third-party offerings are a workgroup software product from ON Technology enabling the instant and automatic updating of all existing copies of a live document; and an upgraded version of QuarkXPress (from Quark Inc.), the desktop-publishing software.

In addition, Apple expects a flurry of follow-on development activity now that System 7 is shipping. For information call 408 996-1010.

Programming from Memory

Ever wish you could pop up a development language and use it to slay some nettlesome kludge? Alpha Software Corp., of Burlington, Mass., has devised a memory-resident programming language designed to create memory-resident applications, automate complex or repetitive tasks and spruce up clunky, outmoded program interfaces.

The package, called Alpha RPL (for resident programming language), interposes itself between the application and the display, allowing programmers to add functionality, simplify interface design and change the application's menu or command structure. For example, a programmer using Alpha RPL could make commands consistent across a number of applications or add such features as drop-down menus, dialogue boxes and context-sensitive help. Developers can also use Alpha RPL to create a common user interface for multiple DOS programs and transfer data among them.



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RPL Browse Window

RPL Browse Menu

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list All commands
list commands by tYpe

translate BASIC commands to RPL
translate KEYWORKS commands to RPL
translate C commands to RPL

Esc to quit, Enter to select
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Another feature of the product is its ability to create programs that automate cumbersome operations.

PC-based Alpha RPL is priced at $595 and requires a hard disk and an 8088 microprocessor or above; the program consumes as little as 36K of conventional memory when used in extended-memory mode. The mainframe version is priced at $995. Both will ship in the second quarter. Alpha can be reached at 617 229-2924.

Easy on the Eyes

The eyestrain suffered by some users when trying to decipher LCD or plasma screens is enough to make portable computing seem like a real headache. Planar Systems is looking to solve this problem with the introduction of a new electroluminescent (EL) flat panel display that boasts many of the visual qualities of CRTs.

Model EL7768MS is driven by the same signal as an LCD and is therefore timing and pin compatible. The EL supports all IBM VGA modes with 16 gray-scale levels and uses a video signal that is compatible with that of a PC or Macintosh. According to Planar, the product, which has a six-by-eight-inch viewing area, provides CRT-type visual qualities of brightness, high-contrast, crisp definition, video timing response and wide-angle readability. The EL is light-emitting and can be viewed both indoors and outdoors.

The EL7768MS is priced under $700 when purchased in quantity and has a built-in troubleshooting function. For more information contact Planar at 503 690-1100.

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GUIDE 80, "IS: The Next Generation"

Boston Marriott Copley Place, Boston
July 14-19
GUIDE International Corp.
312 644-6610

This conference offers technical guidance, management perspective and professional growth to help IS professionals address today's issues and direct future decisions. More than 1,200 sessions are offered to educate attendees and enhance member company operations. Registration fees: $295-$330.

Data Administration and Data Dictionaries

Hyatt Regency, Beaver Creek, Colo.
August 5-7
Barnett Data Systems
301 762-1288

This seminar focuses on both the human and technical aspects of data administration development methodology. Also discussed are the characteristics of proprietary data dictionaries and how they support various data administration activities. Registration fee: $995.

The National Conference on Computing and Values

Southern Connecticut State University, New Haven
August 12-16
The Research Center on Computing and Society
203 397-4423

Fifty speakers address this conference on such topics as computer privacy, computer security, ownership of software, access to computing resources and teaching computing. Included in the exhibit of materials are videos, books, journals and software. Registration fees: $50-$225.

Downsizing Expo

Anaheim Hilton and Towers, Los Angeles
September 10-12
Digital Consulting Inc.
508 470-3870

Preparing MIS and business professionals to deal with the downsizing trend is the theme of this event. The discussions focus on the movement of mission-critical computing away from centralized mainframes and onto networked PCs. Registration fee: $895.

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Without a computer, finding the two that match could be murder.

Just ask the detectives who spent three years looking for the killer of a New Jersey prosecutor. All they had to go on was a fingerprint left at the crime scene. But with a million prints in police files, how could they make a match?

Only with the help of a computer. One that did what computers of a few years ago couldn't do: Compare millions of images for similarity. The computer nailed the murderer.

Police work isn't the only line of work that can benefit from the harnessing of computers to images. As Forbes pointed out in its November 26th cover story, oceanographers used this computer imaging technology to turn a warehouseful of data into a couple of file cabinets. One law firm used it to scan 325,000 pages of documents—a search that would have kept 100 paralegals busy day and night for four months.

The applications for computer imaging systems are so dazzling that one day nearly every office worker could be connected to or near one. What all this means to a sluggish computer industry is growth. The kind of growth that will propel it into the year 2000, and beyond. The Forbes article contradicts Wall Street's conclusion that computers are just another cyclical capital goods industry.

Anyone can tell you what technology does today. Forbes tells you what it will do tomorrow. With gutsy, hard-hitting reporting.

As independent study after study shows, Forbes gives top executives better information and more insights than any of its competitors. In fact, Forbes carries far more editorial on computers than the others—47% more per average issue than Business Week, 89% more than Fortune.

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OFF THE SHELF

SUPERTECH
How America Can Win the Technology Race

By Thomas G. Donlan
Business One Irwin
(Homewood, Ill.), 1991
342 pages, $22.95

Thomas Donlan has seen the enemy and he is us.

A Washington editor of *Barron's* since 1981, Donlan has watched with frustration while American business has fallen woefully behind in key technologies such as HDTV, integrated circuits and supercomputing. A longtime chronicler of economic crises, he is intimately familiar with government shortsightedness, industry greed and what he perceives as the "national necessity" of finding a scapegoat for our woes rather than making the painful choices necessary for achieving economic efficiency. "There is no more important issue facing the United States in the '90s than winning the technology race," writes Donlan, in his new book *Supertech.* "But how we try to win is more important than whether we beat the competition."

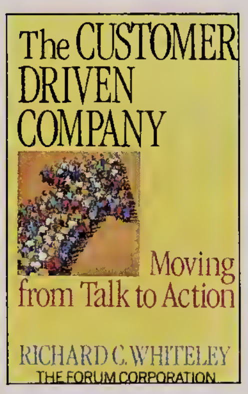
Supertech serves a number of complementary purposes: It provides an easily digestible overview of several technologies certain to be vital in the '90s and beyond, offers a lively commentary on the legal and political battles surrounding their development and application and examines successes and failures in the U.S. electronic industries with an eye toward putting America back on top. (Readers interested in the anatomy of a battle already lost might want to look up James Lardner's fascinating book, *Fast Forward: Hollywood, the Japanese and the VCR Wars.*) Donlan takes an informed, if sometimes unorthodox look at the way business and technology drive one another, and at how government wields its power to advance or impede progress, often with little concern for the public good. While Donlan writes with wit and a sharp eye for the absurdities of bureaucracy inside and outside the public sector, he never loses sight of the enormous stakes involved.

In the final section of *Supertech,* Donlan sketches his own game plan for winning the technology race: a distillation of policy initiatives from "the well-simmered stew of government, the quick-thinking competitiveness of private industry, and the wide-ranging improbabilities of academia."

Part history, part journalism, part cautionary tale, *Supertech* attempts to move beyond rhetoric and focus on practical ways in which the U.S. can take control of its role in the global economy.

THE CUSTOMER-DRIVEN COMPANY
Moving from Talk to Action

By Richard C. Whitely
Addison-Wesley
(Reading, Mass.), 1991
315 pages, $21.95



Most companies pay lip service to the preeminence of their customers. But to many, customers remain a signature on a contract, a name on an invoice, the face across the counter. In his highly readable, meticulously researched book, *The Customer-Driven Company,* Richard C. Whitely argues that this is no longer acceptable. The '90s have a lean and hungry look, and if businesses hope to survive, let alone succeed, they must understand their customers' needs and anticipate their desires, listen to them, learn from them, and above all, satisfy them.

Whitely is vice chairman of The Forum Corp., an international consulting, training and research firm. His book is based on a series of Forum research projects aimed at defining and measuring the practices that distinguish profitable, customer-driven companies from their less successful peers. In addition to a wealth of instructional and anecdotal material, *The Customer-Driven Company* includes a diagnostic self-test so readers can determine their own strengths and weaknesses, and a "Toolkit" section with step-by-step instructions on everything from creating a vision to benchmarking.

The Customer-Driven Company challenges readers to join the Olympian ranks of companies that "do right by the customer every time," and its reasons are compelling. While business has traditionally touted product quality as the principal driver of customer loyalty, Forum's research shows that almost 70 percent of customers who switch companies do so because they are unhappy with the service. Companies that provide both high-quality products and service, such as Honda and British Airways, will be the ultimate winners in the competitive war, Whitely argues.

Whitely structures his book around what he considers the seven essentials of customer service, illustrating each with real-world examples and suggesting a series of "Action Points" to help readers achieve them. In his discussion of the importance of a corporate vision, for example, he chronicles how Johnson & Johnson survived the poisoned Tylenol debacle by adhering, in word and deed, to its commitment to "doctors, nurses, and patients, to mothers and all others who use our products and services." He also urges readers to "invest in complaints," explaining how companies can earn customer loyalty by resolving problems satisfactorily, while at the same time gaining valuable information about business problems and possible new products.

Whitely's final piece of advice to managers is "Walk the Talk"—lead by example, personify the organization's purpose, personally put the customer first. His book is a valuable resource for anyone who agrees that talking isn't enough, and who wants to get a new, customer-driven business strategy on its feet.

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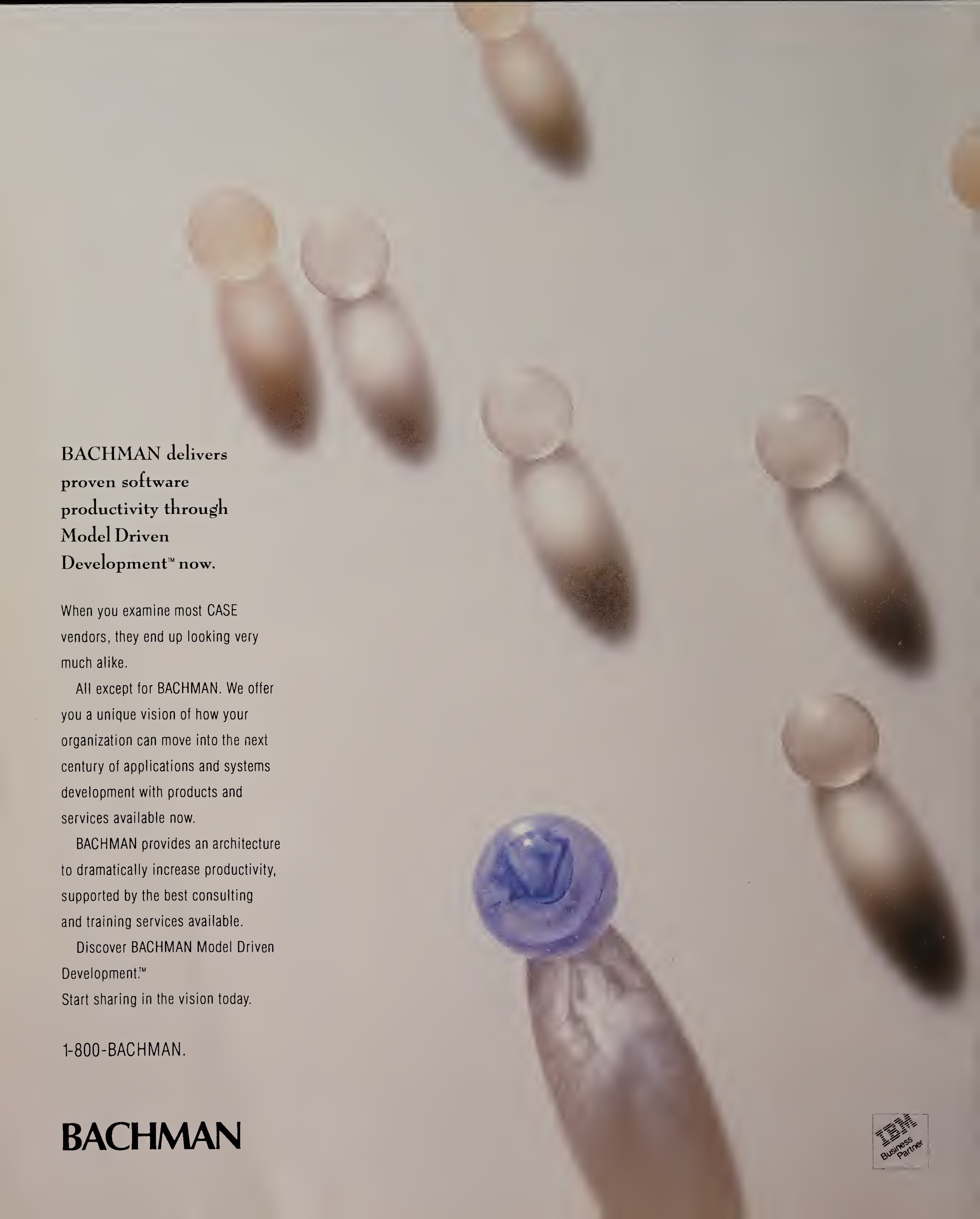

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